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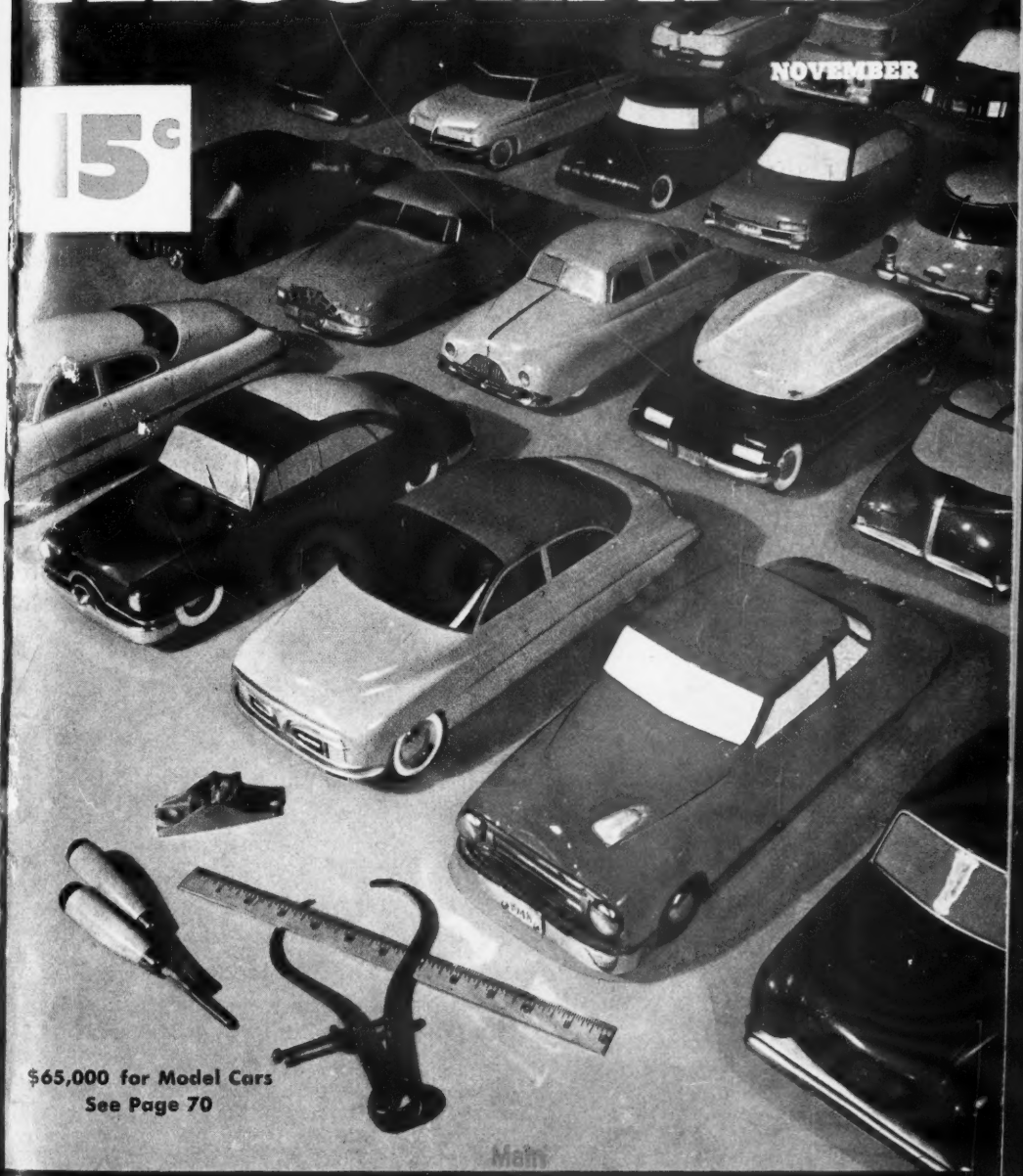

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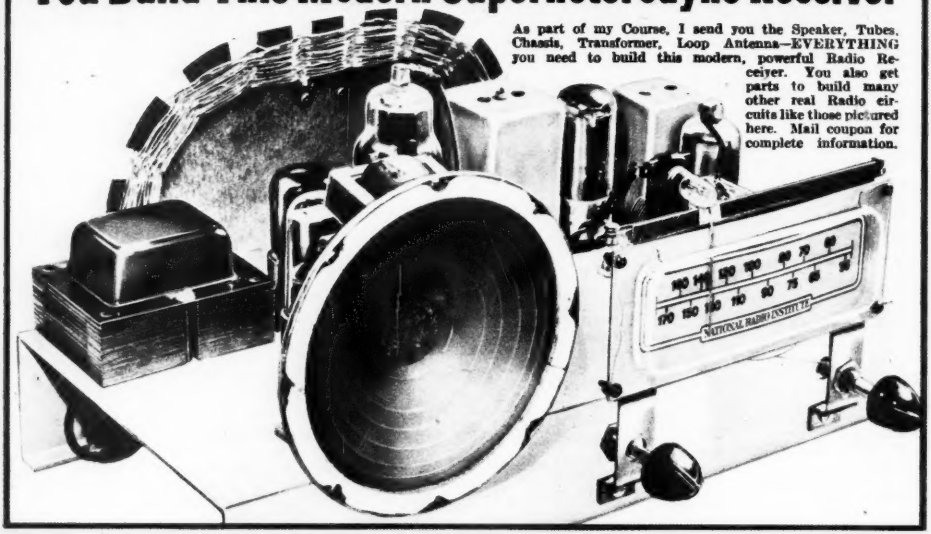

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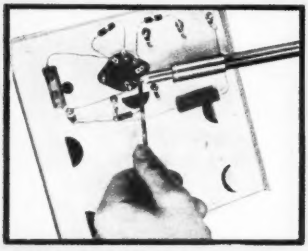

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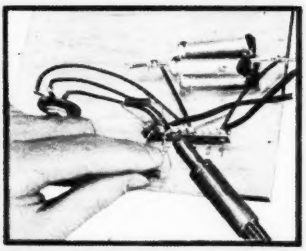

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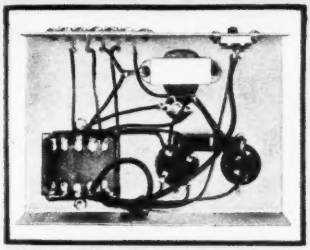

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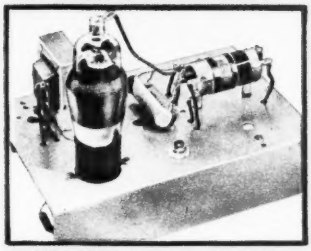

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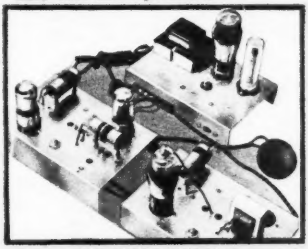

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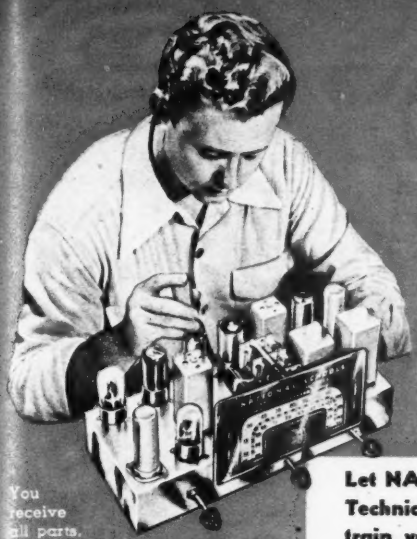

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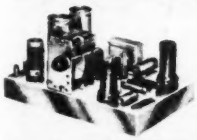

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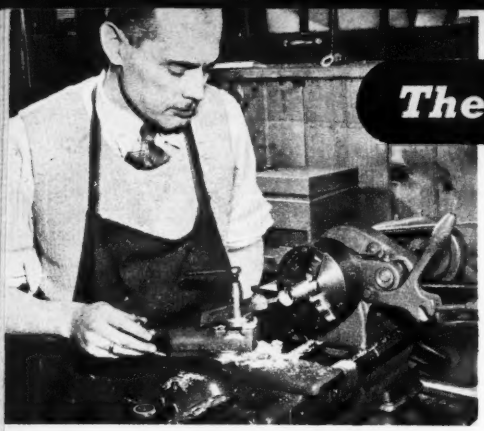
The Editor's Workbench



Robert Brightman, MI's Photo Editor, machining a brass tube into an eyepiece for his telescope.

End of Our Earth?

A few inches of dirt are all that keep you and me and two billion other people alive. The shallow carpet of productive soil which covers the four billion acres of the earth's cultivable land surface is the source of the food we eat, the clothes we wear, the lumber we use in our houses and industries. Take away that soil and —poof! —we're all dead, perhaps not as quickly as if we were hit by giant atom bombs but just as efficiently and, because it would take longer, more painfully.

If anybody suggested that we scrape all this precious earth into a big pile and then dump it into the ocean, we'd call him a maniac, a mass murderer who wanted to wipe out civilization. And yet, through greedy slashing down of forests and reckless overworking of the soil, man has been doing that very thing for so many hundreds of years that today there just isn't enough productive soil left to provide food for everybody. Where has the soil gone? Erosion has washed it away. How fast? Well, in this country alone, says the U. S. Soil Conservation Service, erosion soil losses from farm lands *every year* total the staggering sum of *three billion tons,* sufficient to fill a freight train which would circle the earth *eighteen times!*

"Blind to the need of cooperating with nature, man is destroying the sources of his life," writes Fairfield Osborn, eminent president of the New York Zoological Society, in a book titled Our Plundered Planet (Little, Brown & Co., Boston, $2.50). "Another century like the last and civilization will be facing its final crisis."

Mr. Osborn points out that while it takes between 300 and 1000 years for Old Mother Nature to produce a single inch of topsoil, man has been able to speed up the terrible process of erosion to such an extent that the work of a thousand years can be, and frequently is, wiped out *in a single day!*

The threat of world starvation is not the idle babbling of a crackpot "scientist." It is a very real and deadly threat to us all. That's why we asked Donald G. Cooley, medical authority and diet expert, to find out whether we are winning or losing our battle against famine and to report to us, and to MI's readers, on the steps which responsible scientists are taking to combat the menace of starvation that stalks us all.

You'll find Mr. Cooley's report on page 63 of this issue, under the title Can Sea Farms Avert World Famine? Read it. Think about it. And then stop worrying about the *next* World War. We're in a world war right now—and we've got to win it—or else.

The President's Hobbies

If any Democratic readers think MI played favorites in selecting Republican Presidential Candidate Thomas E. Dewey for this month's Hobby Hall of Fame (page 72), it ain't so. We "elected" Farmer Tom Dewey over President Truman because we thought his hobby of raising prize cattle was more interesting to MI readers than Mr. Truman's hobbies which are, the White House tells us, "walking and reading American history, especially of the Civil War era."

About the first of Mr. Truman's hobbies, walking, the White House reports that ever since he was a young man in Missouri he has enjoyed taking long hikes, using the Army field marching pace of 120 steps to the minute. By timing himself, he can tell exactly how far he has walked. During the past three years in the Presidency, he has managed to squeeze in two or three two-mile walks every week. Friends who accompany him are almost always winded long before Mr. Truman has finished his jaunt. He walks too fast, they complain.

Correction

On page 91 of the October issue (MI Tests the Futuramic Oldsmobile) we quoted Tom McCahill as saying, "Back in 1946 I tested the Oldsmobile '76,' the postwar model, for MI. The Futuramic of 1948 is made only on the large series '98' chassis but it's basically the same machine I drove two years ago."

This statement is incorrect. As Tom stated in his manuscript, before it was edited, the "76" series Oldsmobile of 1946, six-cylinder car, is "for all practical purposes the same today." The Futuramic "98" series of 1948 is an eight-cylinder car and is by no means "basically the same machine" as the "76" series car of 1946.

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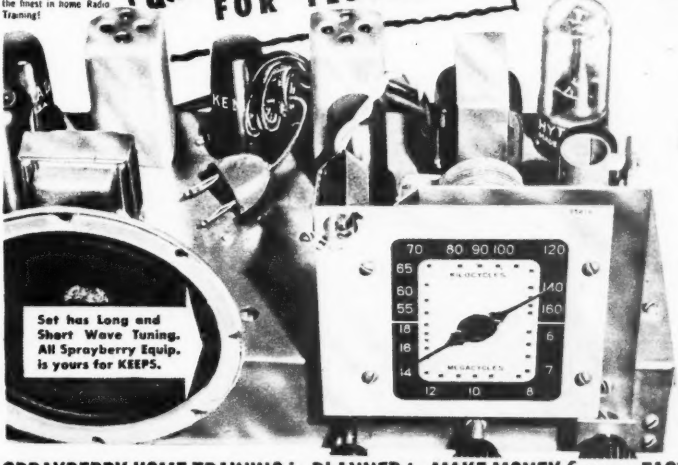

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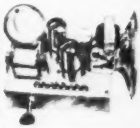

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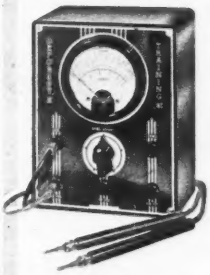

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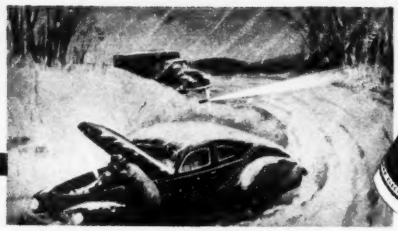

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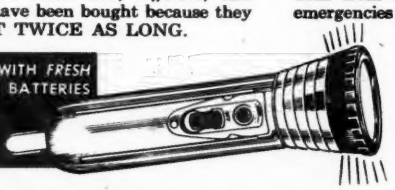

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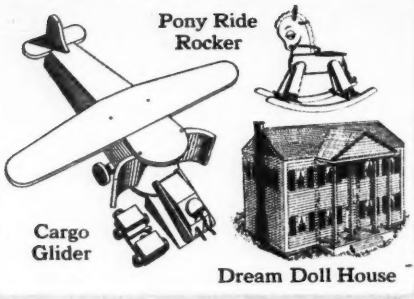

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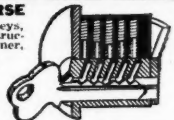

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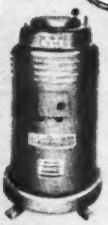

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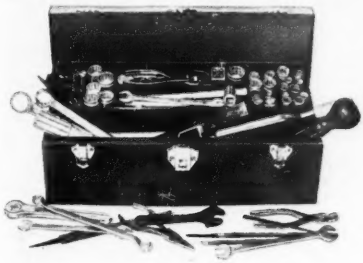

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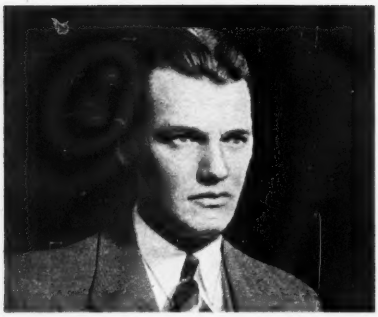

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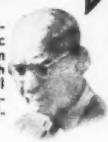

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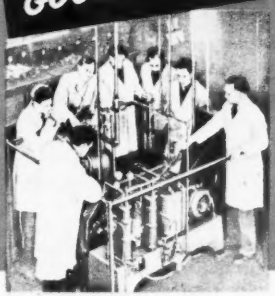

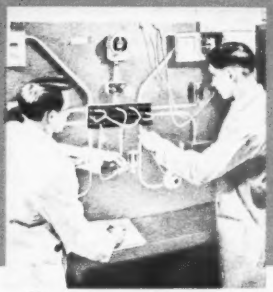

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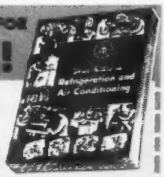

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Conducted by Joseph H. Kraus

To facilitate the answering of their mail, readers desiring the advice of Mr. Kraus on inventions matters are requested to observe the following simple rules: 1) Type or write clearly, on one side of the paper. 2) Make sure that your full name and address, including street number and postal zone, if any, are on the letter and all accompanying papers. 3) Mail drawings or photographs flat, not rolled, and include postage if you want them returned. 5) Do not ask questions relating to patent laws. 6) Do NOT send models.

Address your inquiries to "Your Invention Clinic," MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y. Mr. Kraus will answer as many letters as possible in this column. His services are free.

Latch for Auto Door

John J. Ehlen of Sioux Falls, South Dakota, sends a design for an automobile door latch and wants to know if we think the idea is practical.

ANSWER: Of course, door latches on autos can still be improved. We dislike the projecting handles on car doors and would prefer pushbuttons.

But you have designed a complicated device that's too likely to get out of order. An auto latch should be simple and mechanical, without depending on a battery, compressed air or some similiar force to make the mechanism work. Also, the latch needs a safety lock so that the door will not open by accident.

We doubt that you can develop your design along this line. If you feel you can greatly simplify the design, we suggest that you go ahead and try to work out the idea in detail. After you have projected your idea in an experimental model, have a search made to determine whether you can patent your invention.

Bear in mind that, even if you do get a patent, you still may not be able to put the article on the market. Unless you can sell some auto company on your idea, you can't do anything with it. You will have a better bet if you can develop a good latch for home use. Such an article must be foolproof as well as reasonably burglarproof, and the door must swing open or shut at the right time and in the right direction.

Ice-Cream Scoop

Jerry Larson of Kansas City, Missouri, is having trouble with his design for an ice-cream scoop. He asks us for advice on the construction and for an evaluation of his basic idea.

ANSWER: Before spending a penny on a search or a patent, test a model of your device thoroughly. Frankly, we feel that this article is worthless.

Suppose you plunge your scoop into a full can of ice cream. You dig out a measure of ice cream and drop it into a container for a customer. We are assuming that your scoop is working perfectly and that it is easy both to fill the pickup and empty it.

When a second customer wants some ice cream, you go to another clear spot in the can of ice cream and start scooping again. By the time your fourth customer asks for an order of ice cream, the surface is spotted with holes and there's no smooth, solid area for the scoop. What do you do now—fill the scoop with a spoon?

And what do you do when there's only three or four inches of ice cream left in the container? It's not enough to fill the scoop at one dip. You can keep shifting the scoop from place to place. But, to make your device work right, you must have the cream so soft and easy-flowing that most people won't buy it.

There's no change that we can suggest to improve the construction of your device, since we find your basic idea unsound.

Self-Leveling Platform

William J. Smith of Oregon City, Oregon, has designed a self-leveling platform that he thinks will prevent seasickness. He also has invented an ornamental nutcracker. He wants our comments on both of these ideas.

ANSWER: Hundreds of self-leveling devices are already in use. The simplest of these devices is kept steady on its supports by a weight fastened to the bottom of the article. The compass on board a ship or plane is a good example of this type of self-leveler and is mounted on plain gimbels.

But a mounting of that sort will not prevent seasickness. You can maintain an absolutely level position and still get very sick. If you could prevent a ship from rocking in waves 30 to 60 feet high, or a plane from tossing about in the air or a car from bouncing on

[*Continued on page* 34]

INVENTORS

A patent is a valuable right. On the basis of a constitutional provision Congress has established a system under which inventors may secure the exclusive right to prevent the unauthorized use, manufacture and sale of their inventions for periods of seventeen years. The inventor secures this protection by obtaining a patent.

Unless an inventor is thoroughly familiar with such matters, he is advised to employ a competent registered patent attorney, as the value of patents depends largely upon the skillful preparation of the specification and claims.

We recommend that you authorize us to conduct a search through the United States patents pertinent to your invention and to submit a report setting forth our opinion with respect to its patentability.

This firm is registered to practice before the U. S. Patent Office and is available to assist inventors in the preparation and prosecution of their cases. Detailed information and the preliminary steps to take to obtain patent protection will be furnished upon request. *Form below for mailing convenience.*

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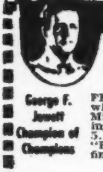

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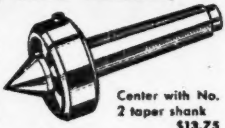

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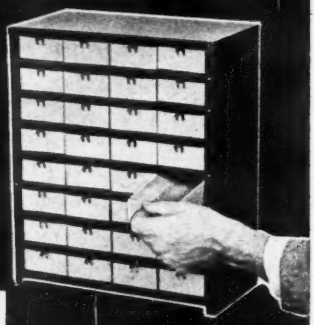

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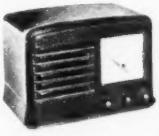

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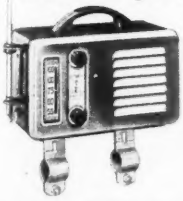

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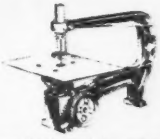

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Your Invention Clinic

[*Continued from page* 28]

the road, you could prevent a lot of sickness. We doubt, though, that you could devise an economical way to stop such motion.

Nutcrackers shaped like humans or animals have been available for years. On the other hand, if your design is based on the way the mechanism cracks nuts, and not on the decorative form, you may be able to get a patent. In this case, we suggest that you authorize your lawyer to have the records searched.

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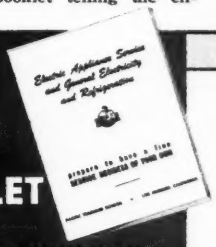

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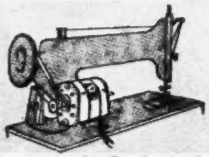

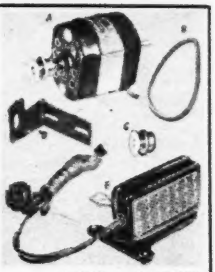

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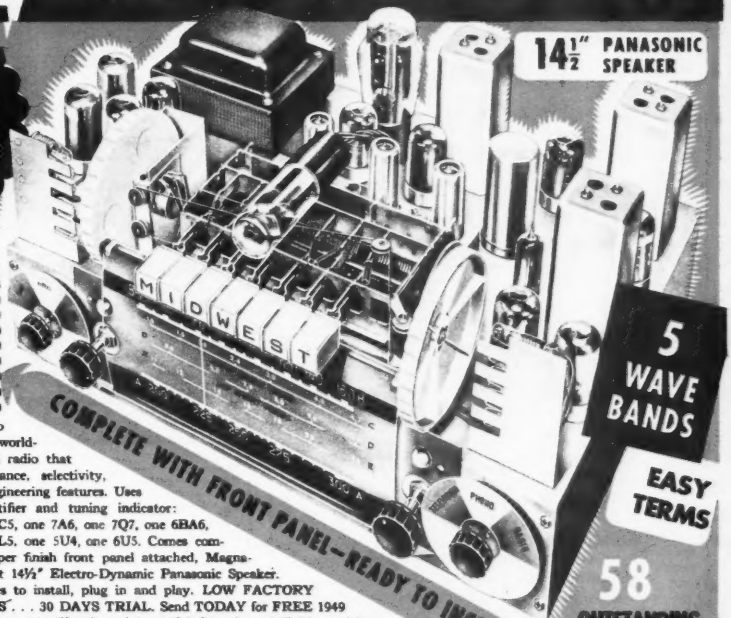

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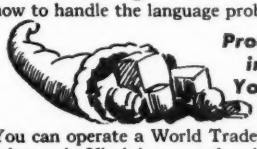

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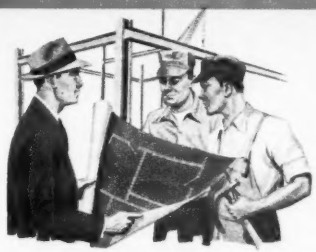

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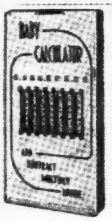

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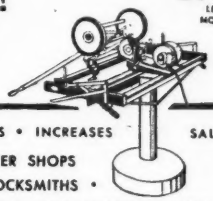

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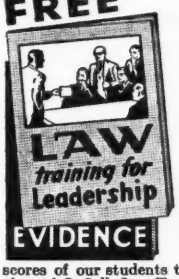

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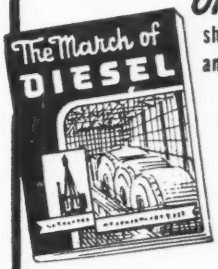

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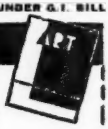

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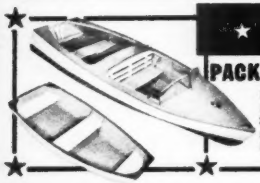

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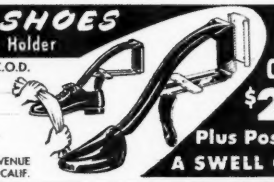

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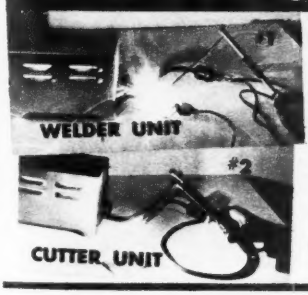

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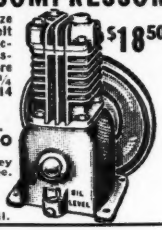

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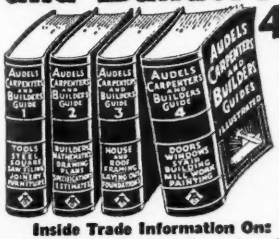

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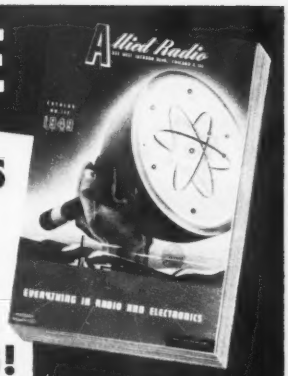

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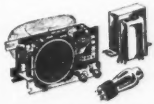

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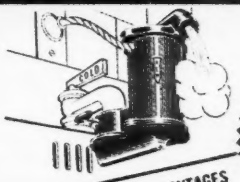

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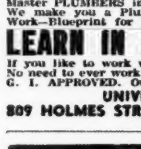

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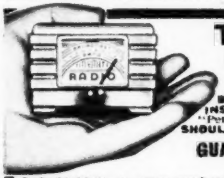

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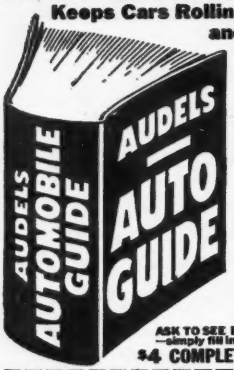

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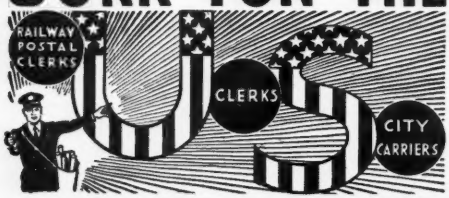

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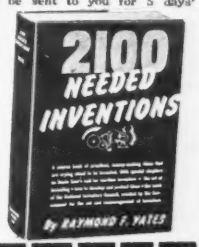

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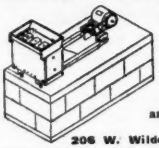

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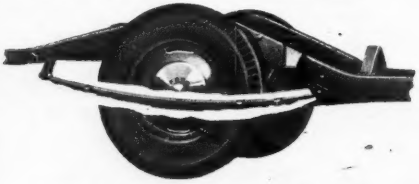
FACTS ABOUT THE '49 FORD "MID SHIP" RIDE

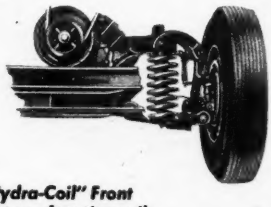
One of the many important advancements that make the '49 Ford "The Car of the Year" is its remarkable "Mid Ship" Ride. Here is a completely new suspension system, using "Para-Flex" Rear Springs and "Hydra-Coil" Front Springs. Both elements of the system have been carefully engineered to work in complete harmony with each other, for a balanced, cushioned ride.



"Para-Flex" Rear Springs are made extra long, extra strong for smoother riding.

The long "Para-Flex" Rear Springs are, as the name implies, semi-elliptic leaf springs mounted parallel to the frame. Impregnated inserts between tips of spring leaves, together with concentrated pressure-type rubber bushings at shackles and brackets, make lubrication unnecessary. Rear shock absorbers are hydraulic double-acting aircraft-type.

The "Hydra-Coil" Front Springs have double-acting hydraulic aircraft-type shock absorbers mounted inside them. This method permits the shock absorbers to be readily removed and replaced, without even jacking up the wheels, and the springs protect them from flying stones, etc. Front wheels move independently of each other, and a new, one-piece rubber-mounted stabilizing bar across the front assists in controlling side-sway.



New "Hydra-Coil" Front Springs use soft-acting coils for the spring suspension.

Added riding comfort is obtained by scientifically positioning seats well forward between the wheels. Result of the combination of these important advancements is the smooth, soft "Mid Ship" Ride for which the '49 Ford is so rightly famed.

FORD MOTOR COMPANY

mechanix illustrated
November 1948

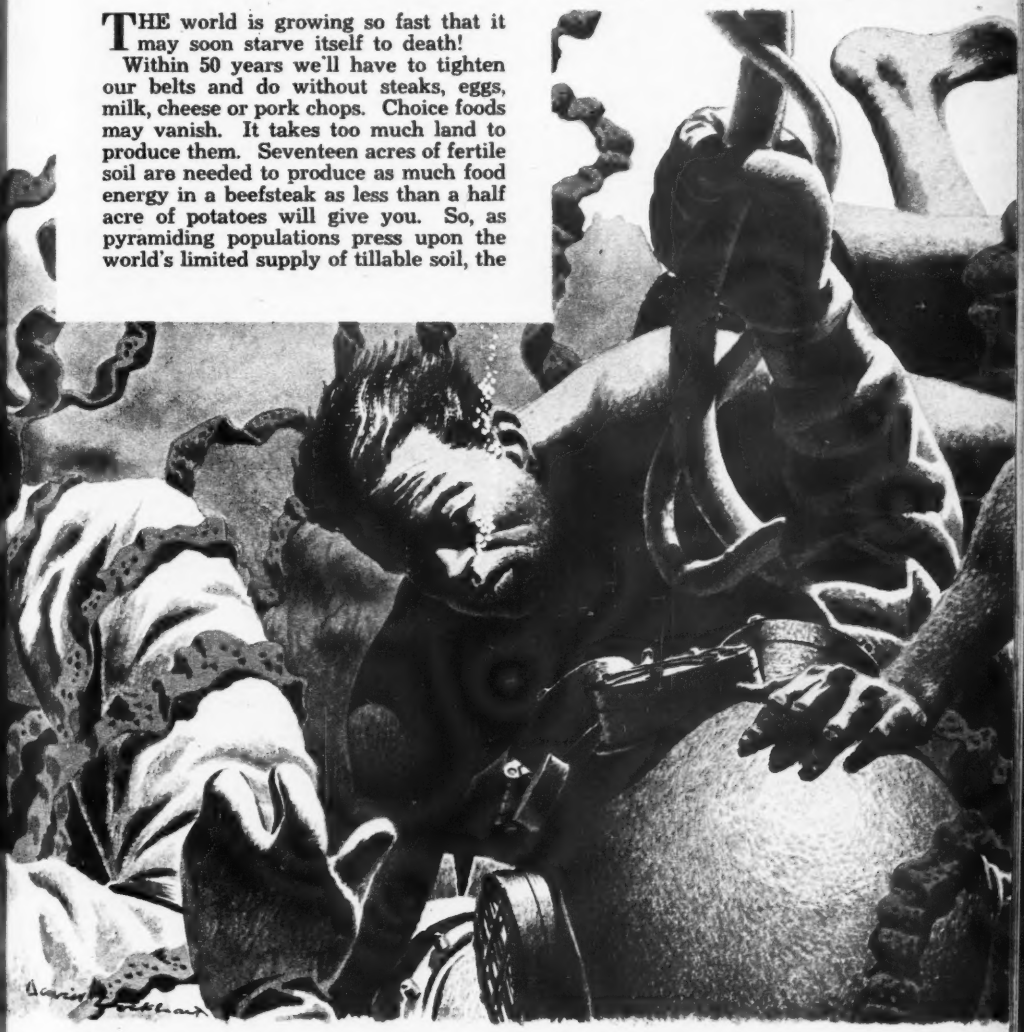
Can Sea Farms Avert WORLD FAMINE?

By Donald G. Cooley

THE world is growing so fast that it may soon starve itself to death!

Within 50 years we'll have to tighten our belts and do without steaks, eggs, milk, cheese or pork chops. Choice foods may vanish. It takes too much land to produce them. Seventeen acres of fertile soil are needed to produce as much food energy in a beefsteak as less than a half acre of potatoes will give you. So, as pyramiding populations press upon the world's limited supply of tillable soil, the

Craig dived in the sea and found himself trapped in a weird underwater farm.



good earth will have to be used for crops that yield the most calories.

What does this mean to you? Well, it takes three acres of good land to keep you alive on your American standard of living. A little less than an acre would keep you alive if you'd settle for the lower living standards of Asia.

If we're running out of land—as we are in proportion to hungry mouths—why can't we get food from other sources? From the sea and the sun, for instance.

All living things, including you, derive their energy ultimately from the sun. If we were as smart as green plants, we could "eat" by merely breathing, drinking water containing trace minerals and exposing ourselves to sunshine. This is essentially the thing plants accomplish through the miracle of photosynthesis. Their chlorophyll—green coloring matter—in some way traps the energy of sunlight and turns inert carbon dioxide and water into sugars. Through this magic, molecules useless to our stomachs are transformed into foods that provide the chemical energy for life.

Clearly, if we knew the plant's secret and could put it to work in sun-trap factories, mankind's food worries would be forever over. At the University of California, Dr. Melvin Calvin and Dr. Andrew A. Benson have been raising plants in a very special atmosphere. Instead of ordinary carbon dioxide, so abundant in air, they provide a special kind containing a radioactive isotope, Carbon 14. As growing plants absorb this gas in their life processes, the course of radioactive carbon atoms through leaves and tissues can be followed with a Geiger counter—a sort of miraculous stethoscope listening to the primal beat of life.

The doctors' most important discovery offers real promise to an ever-hungry

Fishers or farmers? They're "catching" a crop of ribbon kelp—a seaweed now used in making new health foods.

Famine: 1948

Already hunger is gnawing the flesh off the bones of Europe's children. Can new foods restore them to health?

Feast: 1998

Future five-course dinners may include: (1) seaweed, (2) skim milk, (3) eggshells, (4) sawdust, (5) bone.

Even rotten eggs are scraped together for food in Germany.

Millions starve, but here we shovel good wheat on the road like sand.

world. They found that, after sun energy is trapped, photosynthesis takes three directions. One course leads to carbohydrates (sugar and starch) production; another, to oils, and the third, to proteins, making use of minerals in the process.

The enticing prospect held out by Doctors Calvin and Benson is that the chemist can establish very profitable road blocks in the internal life of plants. Suppose he wants a plant to produce large quantities of oil or fat. He can throw a chemical monkey wrench into the plant's starch and protein factories. Solar energy trapped by chlorophyll will then have no choice but to produce fat. By similar blockings, concentrated production of sugars or proteins can be forced.

Presumably, any green plant can be thus educated to jump through a chemical hoop for the benefit of man. Those the experimenters particularly have in mind are algae—a plant family including seaweeds and the green scums you see on stagnant ponds. Marine algae multiply rapidly in sea water. And these algae can give us a new kind of landless agriculture. Just admit ocean water to shallow pools or let it flood flat coastal areas. Then plant "educated" algae. Sunlight does the rest. And the preposterous notion of milking a seaweed becomes an actuality! If you train the plant to produce fat, you can churn butter, or something very close to it from the weed. Or if you make the plants turn out protein, the growing-tanks then are substitutes for rangeland and slaughterhouses, their output taking the place of meat.

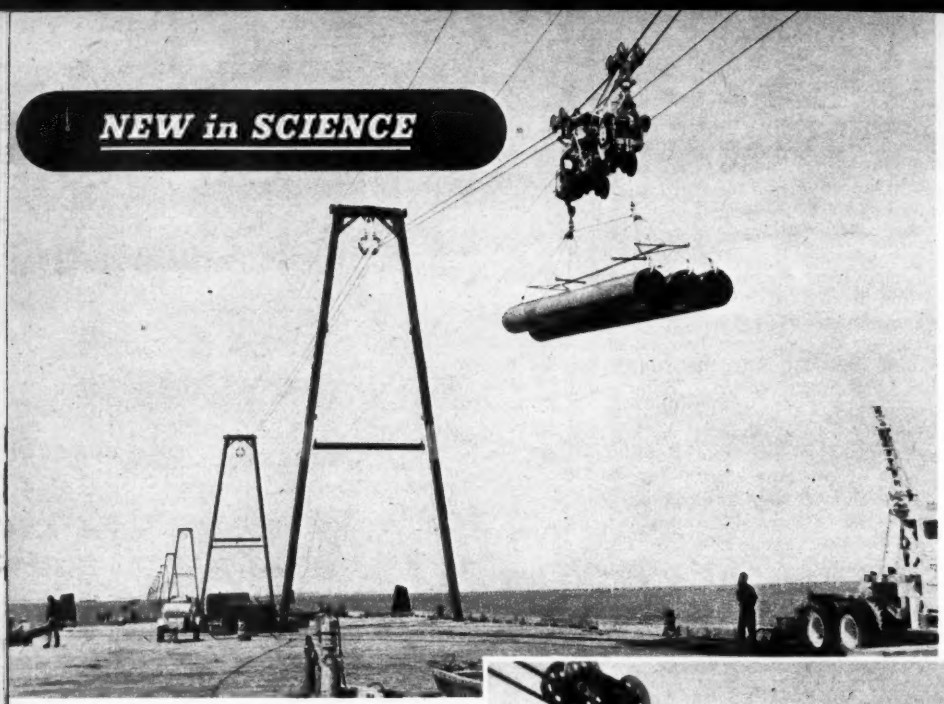
From the angle of human health, such a development is important beyond calculation. For sea water, plus sunlight, contains every element necessary for production of perfect foods. Minerals are present in abundance—indeed, the sea is a vast storehouse for fertility washed from the land by erosion.

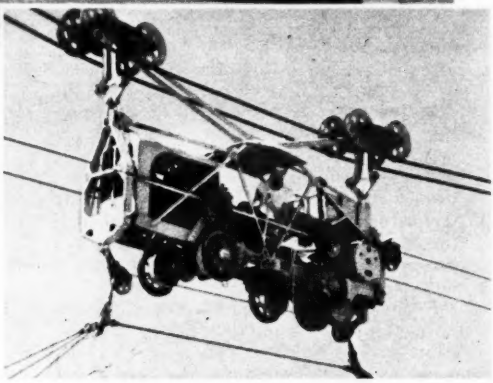
Much hidden starvation is blamed upon consumption of foods that may look and taste excellent, but which lack essential minerals because they have been grown upon depleted lands. Enrichment programs have been adopted to make up for deficiencies: B vitamins and calcium in bread, D vitamins in milk, iodine in table salt, fluorine in drinking water to prevent tooth decay and so on. These costly programs would be unnecessary, and a host of deficiency diseases from pellagra to simple goiter, would be wiped out if any considerable proportion of foods came from mineral-rich sea sources.

There are [*Continued on page* 96]

This hungry Australian isn't fussy about what he eats. He's biting off the head of a snake before cooking it.

NEW in SCIENCE

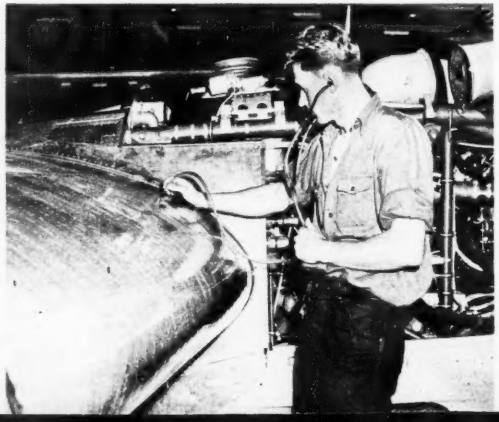




Skyhook Bridge, above, carries tons of steel pipe across three miles of Persian Gulf for the Trans-Arabian Pipeline Company. The pulley makes the trip from cargo vessel to supply base in Saudi Arabia within five minutes. Supporting towers are sunk into the desert and ocean sand. An operator, right, communicates with the shore office by means of a two-way radio system. The pipelines will eventually carry about 400,000 barrels of oil daily a thousand miles across the Arabian Desert to the Mediterranean.

Portable Lung is 400 times lighter than the cumbersome iron type. Below, respirator helps polio victim Ray Howell to breathe.

Assemby-Line Medic: Boeing has borrowed the stethoscope from your family doctor to detect leaks in pressure systems of planes.



NEW for the HOME

Pop-Down Toaster is equipped with hinged shelves which drop the toast out of chutes when it's ready to be eaten. Big enough to take care of rolls, too! Delta Mfg. Corp., Philadelphia.

Rub-A-Tub of clothes with portable washing machine which clamps to basin. Jim Porter Co., of Indianapolis, Ind.

Shine Boy will be off your payroll if electric shoe shiner is on your budget. Manchester Machine Co., St. James, Mo.

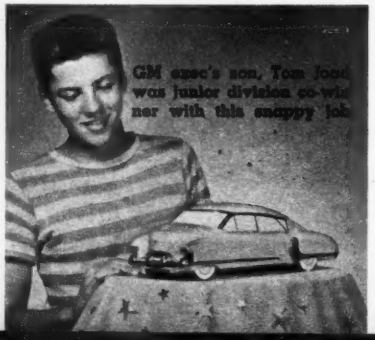
Electricity Broom is current rage in housekeeping circles. Washable bristles are made of electrene, a new plastic which generates static electricity and pulls the dust from your floor. Modglin Co., Los Angeles.

$4000 WINNER: senior division champ Harvey E. Whitman smiles fondly at his model hot-rod.

$65,000 FOR MODEL CARS

Cash and college scholarships await the talented youngsters who design and build winners in the Fisher Body Craftsman's Guild competition.

Aluminum baby, first prize in junior division for Ronald Johnson



GM exec's son, Tom Jood was junior division co-winner with this snappy job

MAKING model cars may be merely a hobby for some people but for thousands of American youngsters it's a pastime with a future!

College scholarships and cash prizes worth more than $350,000 have been awarded 81 boys since the first Fisher Body Craftsman's Guild model-car contest in 1930. This year alone, $65,000 was awarded to lucky regional and national winners.

The Guild contest gives youthful designers prizes of from $1000 to $4000 apiece which may be used to finance their education at any university of their choice. It's a competition which helps develop both the mind and the craftsmanship since the boys must design their own cars and then build models from those same designs.

Ingenuity is the quality which really pays off! Take the case of 15-year-old Ronald Johnson of Portland, Ore. Ordinarily, the Guild technical staff gives instruction in carving models from wood,

SWISS-CHEESE MODEL: here, one of the contestants shapes clay around carefully-carved wooden auto. Then he'll make his mold. Craftsman's Guild technicians give boys instructions in the different methods of model car construction.

casting them from plaster and using the rubber mold method. No one had ever tried making a car of aluminum. Then Ronald came along. He spent 1000 hours on the job —the equivalent of eight hours a day for 125 days! Finally he came up with a perfectly-cast aluminum model which he entered in the contest.

His reward? A duplicate first place in the junior division which netted him a $4000 university scholarship.

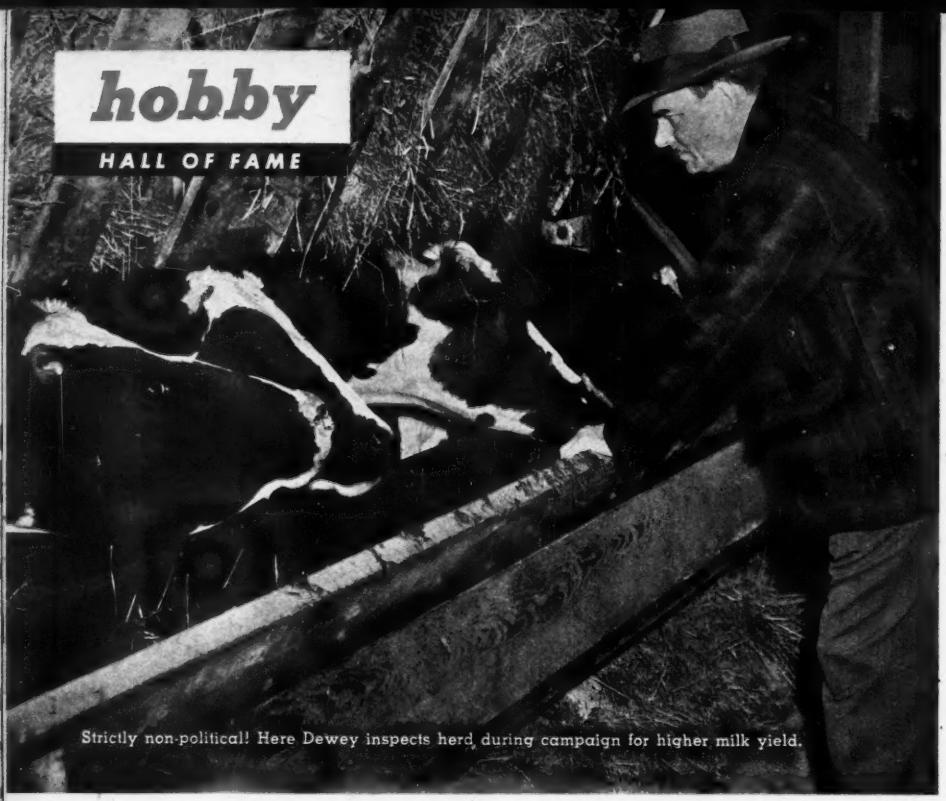
This year, nine national champs were chosen from a group of 43 state and regional winners who came to Detroit for the final selection on expense-free trips.

In almost every case, the champions stressed a higher degree of streamlining and a greater amount of safety. They feature wider bodies, shorter hoods, increased vision and fenderless design.

The expert stylists who judged the contest were surprised to find that industry trend parallels the winners' ideas. It made them realize that among this group of youngsters may very well be the future leaders in the automotive field.*

BREAD-LOAF MODEL: unusual original designs appear even stranger in whittling stage.

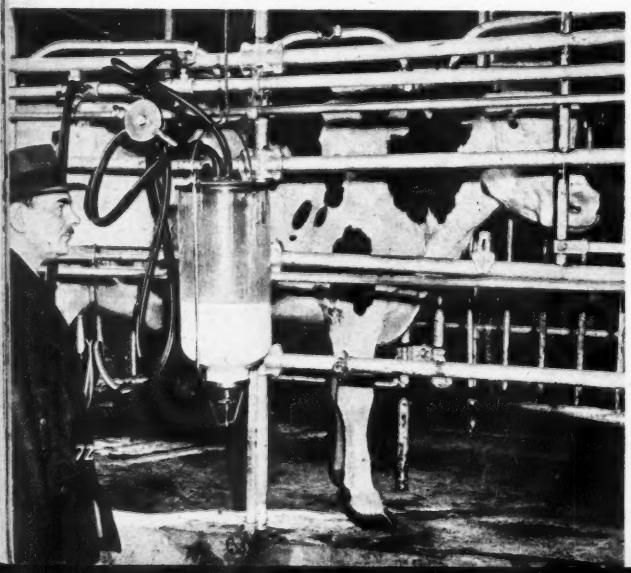
Ole Olsen, head judge since the contest began in 1930, gives kids some useful tips on car design.



Strictly non-political! Here Dewey inspects herd during campaign for higher milk yield.

Tom Dewey—Milkman

Milking combine sends the white stuff directly from milking machine to this glass jar and then by pipe to the milk cans.



BY the time you read this, Thomas E. Dewey, Governor of New York, may also be President-Elect of the United States. But Tom Dewey, farmer, has already earned lasting fame—and a niche in MI's Hobby Hall; he is one of the few executives whose hobby affords relaxation and financial profit too.

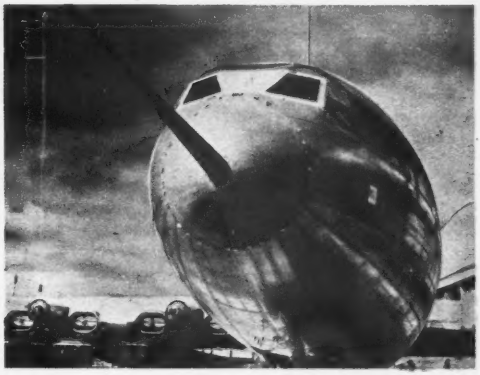
Dapplemere, the Dewey dairy farm boasts 44 Holsteins, four Jerseys, two Guernseys and two Brown Swiss. Their milk has the lowest bacteria count (6700) in the state.

Hobbyist Dewey's secret? Genuine interest in dairying, plus scientific methods. •

NEW in SCIENCE

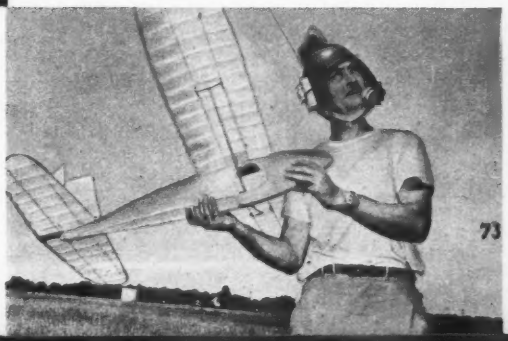
Scoot-Mobile, right, spins merrily along at 25 mph. The two-man vehicle was built by barber Jacob Affannato in his spare time at a cost of $265. It's 75-inches long, weighs 250 pounds and is powered by a four-hp, one-cylinder engine. Cheap to operate, too, as it makes about 60 miles per gallon.

Jiffy Java Vendor, below, produces a hot cup of coffee every five seconds. You make your selection on the dial (black, cream, sugar or cream and sugar) and then deposit coin. The $820 machine has a 400-cup capacity. It's a convenient companion for the doughnut vendor already on the market.



Needle Nose Giant, above, is Britain's largest land plane—the 24 million dollar Brabazon. It has a 230-foot wing span and carries 100 passengers. Why the long schnozzola? It's a wind gauge that tells speed.

Voice Plane, right, is radio controlled by the vocal cords of a ground "pilot." The gas-powered model was built by Jim Walker of Portland, Ore. Sound is transmitted from the converted football helmet, which holds equipment, to "ear" under wing.



He's the Hitler of the bird world. He destroys your gardens and wild life, and caws derisively when you try to match your wits against his.

Gotta Be Sharp to Shoot a Crow

Crow calling takes lots of practice. An expert can call birds back time after time—not quite as close as this decoy, however; it's a pet.

Making a call.

By Bert Popowski.

Author of Crow Shooting*

THE crow is Public Enemy No. 1 of the bird world!

He is a thief, a gangster, and a murderer and yet he lives his criminal life virtually unscathed. He is intelligent but sly, knows when to be bold and when to be wary and has developed a system of totalitarian regimentation that puts Hitler and Mussolini to shame.

He'll nest anywhere and eat almost anything that he can force down his ugly, black gullet. He ranges from Texas to Northern Canada and from coast to coast. Decreasing in number? Not he! Our pheasants, doves, and grouse may die off, but experts estimate that there are *more crows living here now than there were when the Pilgrims landed at Plymouth.*

Why? Because we have done nothing to hamper his propagation. As a matter of fact, we have been of distinct benefit to him. He has been able to avoid with ease our feeble attempts to hunt him. And in our farm fields and gardens and even in our garbage dumps we have supplied him with an abundance of food for his sustenance. He has only one natural enemy—the Great Horned Owl, which attacks only at night and accounts for a few of his number.

What has he done for us? He kills annually more ducks than American and Canadian sportsmen combined. He, along with his co-criminal, the fox, has our pheasant population practically exterminated. Quail and grouse nests are systematically plundered until these birds too, have been reduced to pitifully few. He preys on our songbirds, ruins our crops—in short, he's no damned good! Let's get him!

Crow shooting is fun, and once you've learned to outwit the black devils, you'll have more gun sport than you've ever had before in your life.

There's no closed season on crows; shoot 'em the year 'round. But make sure you bring enough shells with you, because once you get on a crow flight line to a roost, you'll burn up more powder than you have in the ten previous seasons.

Your weapon? Since crows are top-notch aerialists, the gun selected for this sport should be the fastest-swinging 12-gauge scattergun you can get. Trap and skeet shotgun loads make fine ammunition for crow shooting; in fact, the more numerous pellets contained in a fine-shot load are more effective than the fewer pellets contained in game loads of No. 4 or 6 shot. The recoil of such light loads is also much less, a detail you'll appreciate when you find yourself touching off from 50 to 300 shells in an afternoon of shooting!

*Copyright 1946 by A. S. Barnes and Company.

The owl is an excellent crow decoy. This model is made for crow-shooters by Matheny, 60 McLean, Highland Park, Mich.

Get a good crow-call at your sporting goods store and order a couple of the crow-calling records at your phonograph dealer. Then practice the crow language; there are calls of distress, calls of greeting and even crow curses. When you've mastered the lingo, you're all set.

The first thing to look for is a crow roost. Every evening from mid-autumn to mid-spring, crows fly to these nightly sanctu-

Make a good blind and keep hidden! When they come over, let 'em have it. Crows don't mind the noise of gunfire.

In winter dig a trench in the snow for a blind. Below, Bert and son turn in 797 crow feet for a bounty of 10c per bird. Most states pay bounties.

aries from feeding fields as far as 35 miles away. Fall in with a small band of birds and follow it until you find birds coming in from another direction. Then sit back and watch their flight lines into the roost.

By dark, all the crows are in their roost, clotting up the shrubbery so thickly that they break wrist-thick branches by their sheer weight. Their "bed" is further marked by white-washy droppings, by the pecan-sized pellets the birds regurgitate, and by plucked feathers.

Once the roost is located, check the direction of the wind and then set your blind in the flyway leading upwind to the roost. Make it of shrubbery native to the area, for the crow's sharp eyes are quick to detect any change in its favorite resting place. Design it as a hollow rectangle so that any inadvertent motion of the gunner is not silhouetted against a neutral background.

Face your blind downwind. Most of the shooting will be at birds that are breasting the air currents. Birds that come in with the wind should be allowed to pass the blind, then called back to it against the wind.

Above all, don't show yourself to the crows! Talking, loud laughter and yells of triumph are also taboo. Contrary to popular belief, crows are not especially frightened of gunfire—if they do not glimpse the gunners. In fact, an expert caller can call back crows that have been slightly flushed by gunfire. In some cases a flock of half a dozen birds can be brought back repeatedly until every one of them is killed.

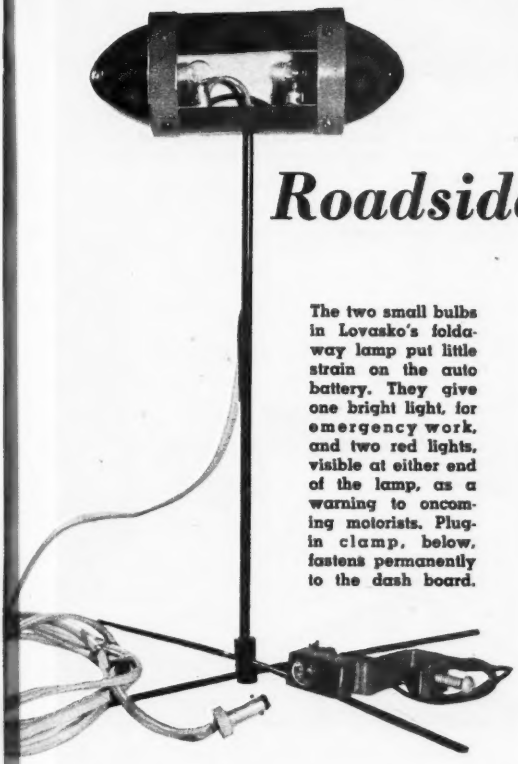
Generally, the blind should be ready no later than 2:30 in the afternoon. If the day is overcast, crows as a rule come in earlier than when the weather is warm and clear. In any case, the gunners should be in place before the vanguard of the flight line begins to seek the shelter of the roost. All that is needed now is a good eye and a strong shooting arm. When crows approach within hearing, go to work with your call.

The best crow callers carry the call pinched between thumb and forefinger, even while shooting. The moment a shot is delivered the call goes back to the caller's lips and he renews his crow-like yells for help. While the crows are still some distance away, the fingers of the hand are held megaphone-like about the muzzle of the call to help carry its S. O. S. far and [*Continued on page* 140]

THIS MONTH'S

prize gadget

Roadside Safety Light



The two small bulbs in Lovasko's foldaway lamp put little strain on the auto battery. They give one bright light, for emergency work, and two red lights, visible at either end of the lamp, as a warning to oncoming motorists. Plug-in clamp, below, fastens permanently to the dash board.

DARKEST moment in the life of Henry Lovasko was that night in 1941 when he got a flat and had to sweat out a tire change in the path of speeding cars. He had a small flashlight but there was no one to hold it and no way to warn off the onrushing traffic. Every time an auto approached Henry had to drop his tools and jump for safety.

That dark moment underlined the need for a safety light to cover such roadside emergencies. All the time he could spare from his refinery job he spent experimenting with portable lamps in his home workshop at Whiting, Ind., until the war and Air Force service interrupted. Recently his search for a practical roadside safety light paid off with the $50 Prize Gadget you see on this page—a two-in-one lamp to light up a repair job and to warn oncoming cars. •

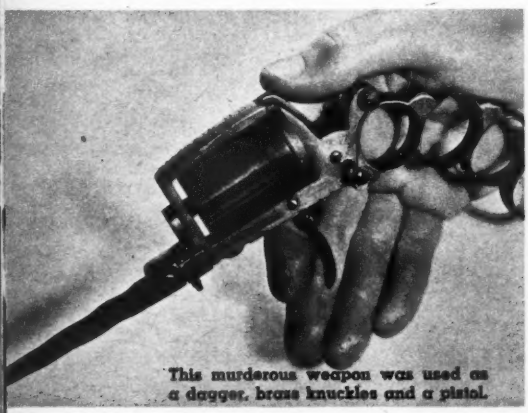
WIN $50

Dreamed up a neat gadget? If you're pretty keen about that pet project of yours, get busy and work it out in your shop. Then send pictures and a description of your invention to Gadget Editor, MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y. Each month the best entry, in the opinion of MI's editors, will be awarded $50 for the Prize Gadget.

Inventor Lovasko shows how handily his light lets up for safe roadside work in the dark.

Christmas-wrapped shotgun nearly killed a New York woman. Her husband convinced a female friend that the package held a camera and got her to "shoot" his wife.

KILLERS in disguise



This murderous weapon was used as a dagger, brass knuckles and a pistol.

This watch charm killed a man! Small but deadly, it shoots a needle-size bullet.

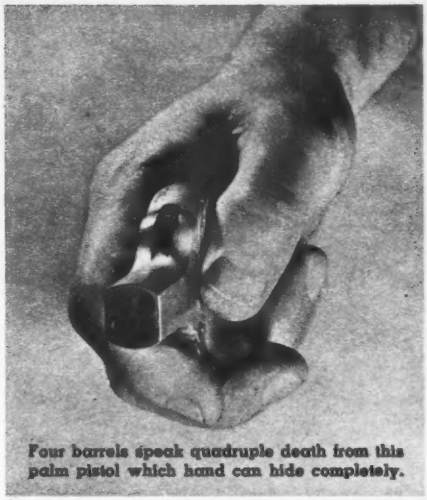
Flashlight pistol locates its victim in the dark. Trigger (below) sends bullet along light path.

EVER hear of a watch charm being used to murder a man? The New York City Police have—and they have the weapon to prove it!

The department has a collection of confiscated guns which is one of the weirdest assortments of lethal firearms in the world. A polyglot town such as New York has criminals of all races and most of them have favorite trick "shooters." Some make them, some bring them home as souvenirs, while others convert them from harmless devices designed for other purposes.

There are conventional pistols, too. But whatever their origin, the chances are that the city police will run across them sooner or later. They've seen every variety in existence.

That's why they'll attest to the fact that man is probably most clever when he is being most destructive. •



Four barrels speak quadruple death from this palm pistol which hand can hide completely.

Vest-pocket killer is decorated with pearl and engraving. Pressure on handle shoots it.

Four-shot automatic has multiple barrel which slides out for reloading.

A MONEY-MAKING

idea

Portrait of a happy man: Kelley working on an old Swiss music box.

I Found New Cash in an OLD MUSIC BOX

By Lloyd G. Kelley

Photos by Alfred Eris

Here's how Kelley stamps out a record from a big master plate. Right, he checks music bells for tone.

BORED one evening, I strolled down one of Boston's crooked side streets and wandered into an ancient second-hand store. Because of that stroll 13 years ago, today I'm no longer a traveling salesman for a food company but the owner of a healthy business that supposedly was as dead as grandma's spinning wheel.

As I glanced about in the dusty gloom of the old shop that day, I spotted a beautiful little walnut chest, superbly hand-carved. Intrigued, I opened up the chest and found it was a music box—the first I'd ever seen. When the battered metal record tinkled out Home, Sweet Home, I got all mellow with sentiment. Could be pleasant to sit back and hear the old melodies jingling quaintly on the antique music box. I was set to buy the machine but the deal fell through when the shopkeeper told me that the beat-up record was the only one he had in stock.

I kept hearing the charming tinkle of that old music box in my ears. I began poking around other antique shops and looking for discs. A couple of weeks later I stumbled across two other music boxes in a second-hand store at Chelsea, Mass. One was an old Regina type and the other a Swiss model. Neither mechanism worked and there was still the problem of finding discs.

The longer I looked at those old music boxes, though, the more sentimental I got. I ended up by buying both of them and then chasing all over Boston for three weeks to find an old-time clockmaker who knew how to repair the machines. After more diligent [*Continued on page* 95]

Kelley likes to play his prize music boxes for his friends.

Meet The BLIZZARD WIZARD

They laughed when Socey predicted last winter's Big Snow, but the laugh was on them when 800 million tons smothered New York.

By John Parker

"Light snow ending in the forenoon." That was the official United States Weather Bureau forecast on the morning of December 26, 1947. Socey said "Heavy snow."

Newspaper readers and radio listeners in New York City looked out of their apartment windows and saw snow flurries. But they were confident the snow would end soon—after all the Weather Bureau had said so! Socey still said "Heavy snow."

The flurries grew heavier and began to cover the hoods of cars and the window ledges. Far past forenoon the thick flakes fell. Before the storm was over, 26 inches of snow dropped on a stunned New York. Railroad traffic in and out of the metropolis was disrupted, vital subway routes were closed down. A city which depended for its food supply upon trucks and refrigerator cars was threatened with a real shortage. Mayor O'Dwyer was forced to call upon all available manpower to wield shovels and dig out from under the biggest snow New York had ever seen.

Francis P. Socey, Jr., meteorologist at the Westchester County Airport in New York, had been predicting a snowy Winter since the previous Fall. Then, on December 10, he had narrowed his sights and forecast a 15-inch snowfall. Calmly, he waited for his prophecy to come true! It did!

Then, while the city was still struggling out of its smothering blanket of snow, he predicted that Easter would be "cloudy and cool with light rain or snow." The Weather Bureau scoffed—but Easter turned out to be exactly that! At the same time he outlined the coming Spring weather: "Excessive rains, particularly in the East; decidedly wet with the possibility of floods in the Ohio Valley."

Skiing in the world's largest city! Are we in for another record winter? Socey knows.

MI Photos by Jay Seymour

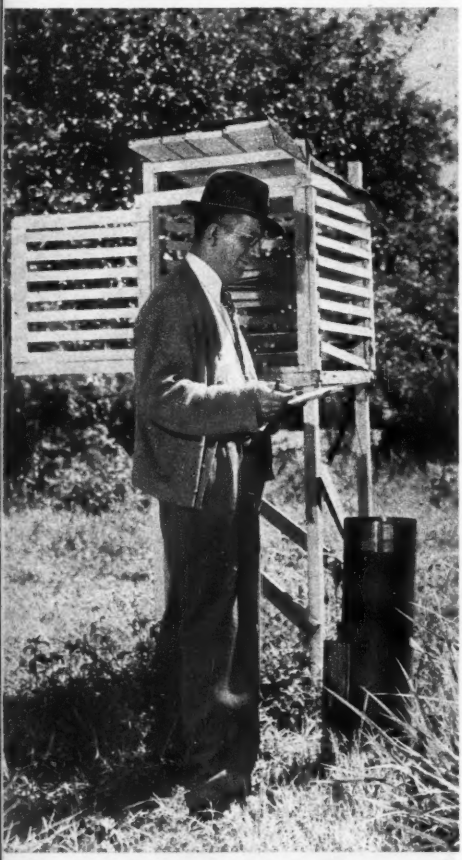
He trains 'em young! Daughter Bunny, who predicts rain, makes Daddy take his rubbers.

The still-skeptical Weather Bureau later reported the wettest Spring in its 77-year history! And just last June he predicted 103-degree temperatures in August for the East. On August 26, the mercury hit 105 in Hartford, Conn., as the entire East coast sweltered under a heat wave.

Those are some of Socey's more dramatic hits. But his batting average has run as high as 80 per cent. And Socey's forecasts are made at long range—not the mere 24-hour predictions that government meteorologists claim is the limit.

Socey claims that his system takes up where the Air Mass method of forecasting leaves off. According to the Air Mass system, weather changes when "lows" (masses of air with low barometric pressure) meet "highs" (masses of air with high barometric pressure). "Fronts"

From astronomical weather charts dating back to 1899, he works out a forecast.



Blizzard Wizard at work! Here Frank Socey is checking his rain gauge and thermometer.

mark the area where these shifting oceans of air collide. What we call storms are the result.

Socey finds his key in tabulating the influence of nearby planets. He studies the gravitational effect of Mercury, Venus, Mars, Jupiter, Saturn, Uranus and Neptune. These are nearest the earth and exert the most gravitational pull on the air masses that produce weather changes. Don't confuse his system, which is based on Astronomy, with the hocus-pocus of Astrology.

The planets seem to have these broad effects:

MERCURY: wind
VENUS: precipitation (rain, snow, hail, sleet)
MARS: heat (short duration)
JUPITER: heat (gentle and of great duration)
SATURN: cold (short duration)
URANUS: cold (gentler and of greater duration)
NEPTUNE: very changeable.

The combinations of planets in the sky cause variations in the weather in areas where they appear. Socey has made hundreds of tables, converting planetary combinations into historical weather maps running back 50 years. Over this long period he has noted whenever a specific combination has produced consistently similar weather effects.

Socey is now establishing his own weather service in Valhalla, N. Y. After six weeks of calculation, he has come up with these predictions for MI readers.

NOVEMBER: turbulent month. Thanksgiving will be a pleasant, mild day, sandwiched between storms around the middle and end of the month.

DECEMBER: severe. Less than an even chance for a white Christmas. Before New Year's day, there will be lots of snow which may turn to rain in the East.

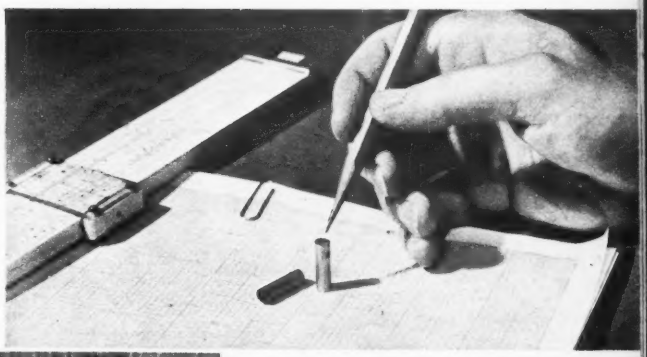
JANUARY: wet and warmish. Toward the end of the month heavy blizzards will strike between Grand Rapids and Buffalo, moving East in the first few days of February.

So, if you take the advice of the Blizzard Wizard you'll get your heavy overcoat out of the mothballs and prepare for a rough Winter. And if you're inclined to be skeptical—just remember the blizzard of '47! •

NEW in SCIENCE

Trial by Fire proves this table top can take the toughest treatment and still look fresh from the factory. Seven layers of plastic laminated with Bakelite resins form a glossy surface that resists burning, chipping and staining. Baumritter Co. of New York City is marketing furniture finished with this tarnishproof table top.

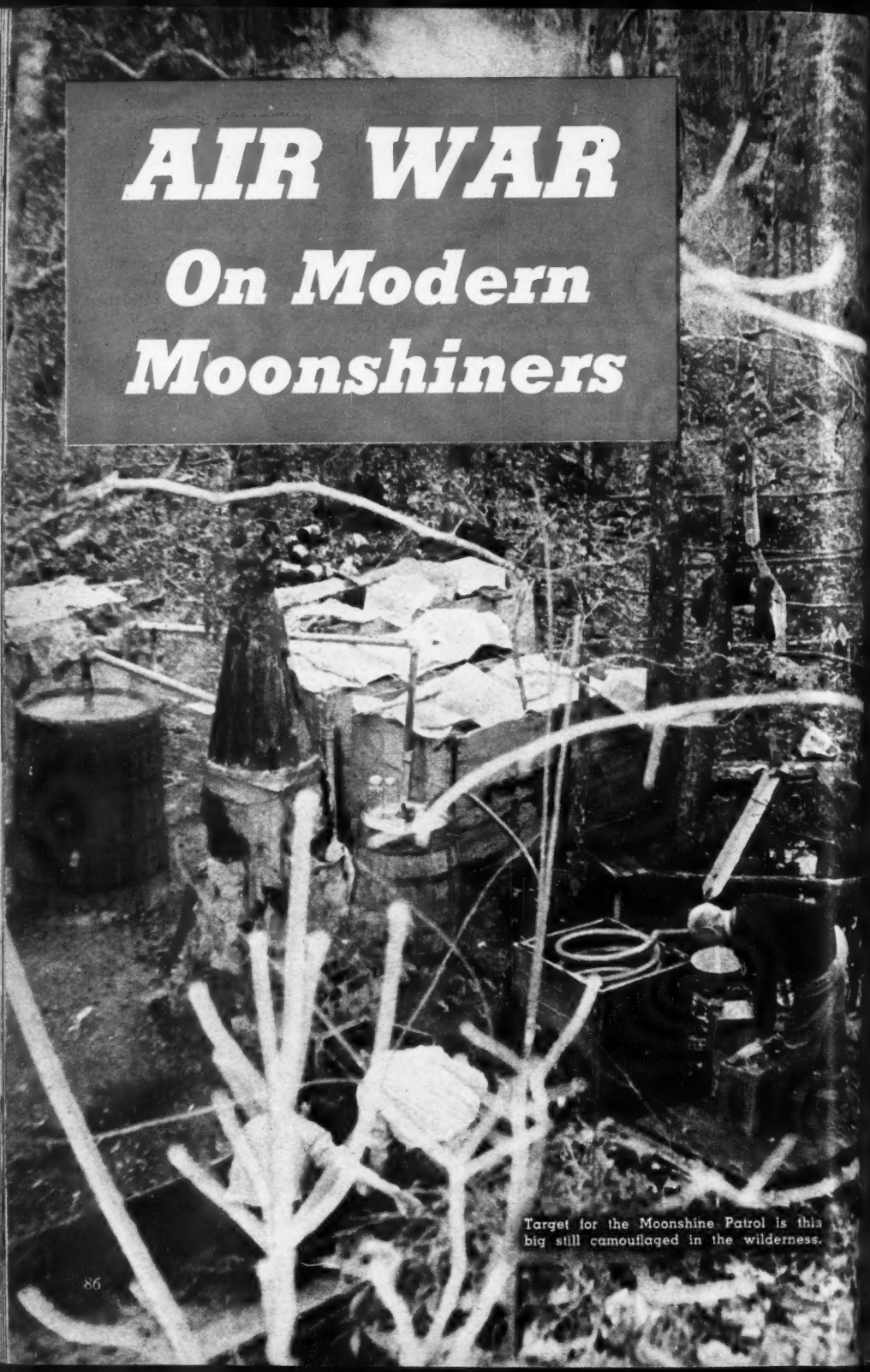
Tiny Tube can make a mighty noise. New electronic device, called the Transistor, may amplify sounds as much as 100 to 1. Developed by Bell Telephone Laboratories during research on the electrical properties of solids, the new device does the work of a vacuum tube without any vacuum at all.



Desk Facsimile left, makes it possible for Western Union to provide you with ten-minute telegraph service. You place your message in desk set that transmits it to a central office which, in turn sends it on to the addressee's machine. It'll save you tip money because it eliminates the messenger boy completely from this service.

Electronic Cop may make things rough for lawbreakers. Fingerprints can now be transmitted over facsimile radio waves and help overcome the old police bottleneck in checking the prints of captured criminals. Here, Syracuse, N. Y. Police Department officers examine fingerprints received over a facsimile set during a demonstration by General Electric engineers.

AIR WAR On Modern Moonshiners



Target for the Moonshine Patrol is this big still camouflaged in the wilderness.

By James Nevin Miller

THE United States is fighting a secret war, right in our own backwoods. Air and ground forces are invading the Southeast along an 800-mile wilderness front and ambushing the enemy at his camouflaged bases.

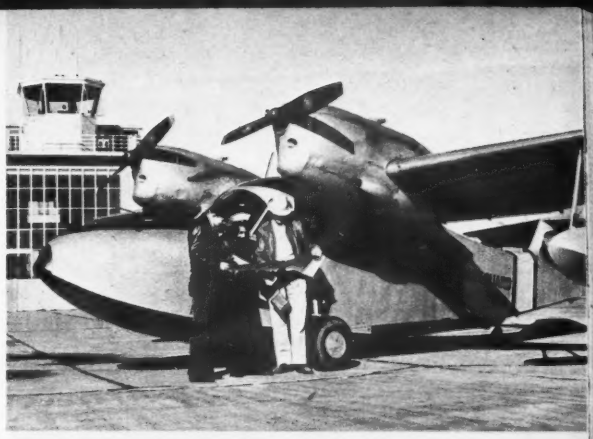
The invaders in this multimillion-dollar battle are ATU men—from the Treasury's Alcohol Tax Unit, Bureau of Internal Revenue—and the enemy is the modern moonshiner.

One of the unheroic victims of World War II was the old-fashioned moonshiner. The war effort put him strictly on short rations—only costly black-market sugar or grain for booze-making, no metal for the still, no gas for the bootleg buggy. What with the shortages and the draft board breathing hard on the bootlegger's back, things were tough all over for the rugged mountain moonshiner.

Then with rationing lifted after the war and the legal whiskey-makers unable to roll out their full quota of liquor barrels, moonshining staged a comeback. The moonshiner went modern and picked up some wartime strategy—camouflage, short-wave radio communications, lookout patrols, automatic alarms to warn of raids. Bootlegging suddenly blossomed bigger and bolder than ever before in the hills and swamplands of Virginia, North and South Carolina, Kentucky, Tennessee, Georgia and Florida. For a while the moonshiner "never had it so good."

Then the ATU men got up in arms, borrowed planes and pilots from the Coast Guard and mapped out an air war to wipe out the modern moonshiner. The revenuers boned up on the latest military strategy, too, and worked out plans for air-ground teamwork with walkie-talkies and split-second battle-timing patterned on World War II tactics. They began organizing for a raid just as the Army and the Air Force do for a major battle.

In a recent campaign the air-minded ATU raiders blasted 229



BRIEFED: Pilot and ATU agents check mission map at a secret airbase after a "war" briefing with the ground crew and prepare to scout the enemy.

SPOTTED: That's the hot news the pilot is passing to the ground crew after the observer's sharp eye has pinpointed a hideaway still 5000 feet below.

RELAYED: Walkie-talkie, tuned to the scouting plane's frequency, picks up the sighting message. Ground crew stands by for orders—and action.

TRAPPED: There was no hole in the net for these two birds to fly through when the ATU raiders suddenly sprang up and slapped on the handcuffs.

stills, nabbed 125 'shiners and destroyed 98,305 gallons of mash and 1603 gallons of hooch. Just one flight of the "Moonshine Air Patrol" spotted as many as 34 stills, some of which were turning out 500 gallons a day per unit. During 1947 ATU's "moon" men captured 4924 prisoners. The courts found 4235 of these moonwar captives guilty of brewing taxfree booze and punished them with prison terms, heavy fines or both. On the basis of a $9-per-gallon liquor tax, ATU seizures of mash and moon saved the U. S. Treasury a tidy $3,000,000 last year.

The modern moonshiners are heavily armed as they operate from abandoned houses or barns and from hideaways deep in the woods or swamplands. When the ATU forces close in, the bootleg boys fight back desperately and resort to guerrilla tactics, arson and murder. Government officials say more men in the Alcohol Tax Unit are killed or wounded in violent battle than in other Federal law-enforcement work.

Here's how the anti-moon men are probing every corner of the Southeastern wilderness for hidden bootleg bases and waging a relentless air war on the moonshiners:

Before going into action, the ATU officers meet at a secret airport and set their plan of attack at a briefing session just like the wartime preparation for a big combat mission. An officer thoroughly familiar with the territory takes command of the entire day's operation and briefs the men on the area. The commander, who also serves as aerial observer during the Moonshine Air Patrol, carefully works out procedure for capturing a still with the pilot of the Coast Guard amphibian, the walkie-talkie operators and the ground crew who run the two-way radio cars.

After studying area maps, the men decide on a rendezvous that they can use as the control spot for "the invasion." This rendezvous is located near a highway, if possible, so that the moonshiners won't be immediately alerted by cars cruising in the area.

The Moonshine Air Patrol usually covers about 500 square miles during a flight. The first job of the flying ATU men is to spot

as many active stills as possible so that they can be raided by the ground forces and dynamited that very day. When the observer-commander spots a still, he contacts his ground radio-patrol. He tells them the location of the still, its estimated size and topography, the roads or waterways leading into the hideout and the possible number of moonshiners in the vicinity. The ground forces swing into action, roll their cars into a sheltered spot near the target area, then steal silently into ambush positions surrounding the still. The plane stays just out of sight of the bootleggers but keeps close radio contact with the ground crew.

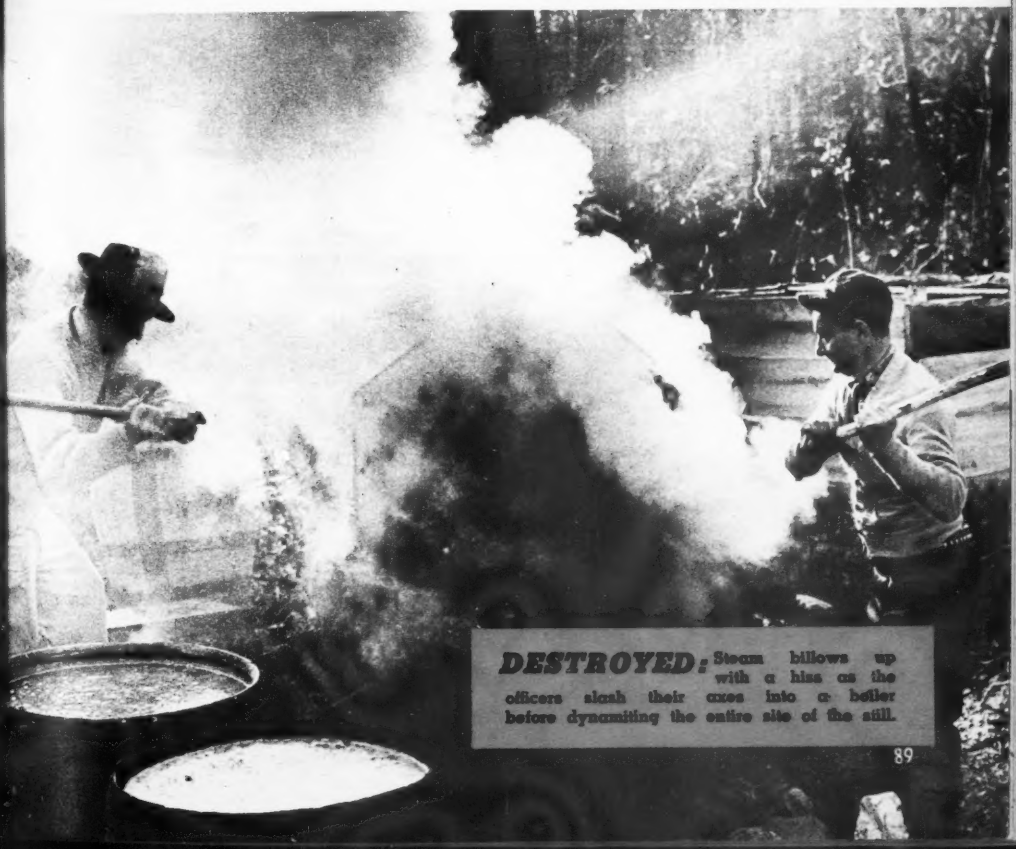
When the land forces are all set, the air commander signals the men to close in for the kill. While the men on the ground grapple with lookouts or dodge the almost invisible silk thread strung around the area by the moonshiners to sound an automatic raid warning, the plane flies right over the still. If a bootlegger does make a getaway or shoot a hole through the tightening net, the plane pursues and directs his capture from the air. By this sky spying, moonshiners who escaped by car have been chased 15 miles and caught, and one was even found hiding in a church.

When all the prisoners have been rounded up, the whole area is examined, and samples of liquor and mash taken for evidence in court. The ATU men gauge the capacity of the still and the length of time it's been operating, so that they can figure how much the booze brewers owe the Treasury in liquor taxes. Then the raiding agents start smashing the equipment with axes and prepare to dynamite the whole site.

Then the officers must check on the owner of the property and find out if he knew about the still or had any part in its operation. If they suspect that the owner had any connection with the still, they add him to the roundup, too.

After an ATU campaign has cleaned up all the stills in one section, the Moonshine Patrol flies off to invade another area.

The air war on the modern moonshiner isn't over yet. He's still battling hard to brew that bootleg. But the new weapons and the co-ordinated air-ground attacks have got him bracing himself on his own brew and wondering if there isn't an easier way to make a dollar than trying to steal taxes out of Uncle Sam's Treasury. •



DESTROYED: Steam billows up with a hiss as the officers slash their axes into a boiler before dynamiting the entire site of the still.

MI Tests the New Nash

By Tom McCahill

NASH, one of the oldest auto makers in America, has gone overboard for the newest fad in car designs and come up with two hot candidates for Miss Upside-Down Bathtub of 1949. When I tested the new Nash line at the proving grounds at Burlington, Wisconsin, I found the 600 and the Ambassador had jumped into the latest fashion with both faucets wide open.

It's smart to have no fenders, and there are no smarter cars on the road now than the new Nashes. But there's more than mere smartness in these models. The Ambassador, the Nash entry in the medium-priced field, is a magnificent-looking automobile, inside and out. It has that luxury look of cars costing $1000 more than it does. The 600, which flies the Nash colors in the low-priced market, is miles ahead of its competitors on two counts—

Bullet-back Ambassador, "smuggled" to Tom by truck, rolls out for testing.

economy and comfort.

An exclusive feature of all Nash sedans is the convertible double bed that you can set up in the car in a jiffy. This bed arrangement takes no space from the extra large trunk compartment and can be made up in either single or double section by dropping the hinged back of the split front seat so that it forms a comfortable mattress with the rear seat. Another Nash innovation is the Uniscope, a compact instrument panel streamlined on the top side of the steering column for easier "cockpit control."

Tom keeps driving while Nash engineer eases back for a nap on the car bed. Note "cockpit" instrument panel and key lock under wheel.

The Ambassador and the 600 both now have coil-spring suspension of both front and rear wheels as well as torque-tube drive. Like other car manufacturers, they also are using the jumbo balloon tires—those 24-pound wonders that, for my dough, could be better off stuffed right back on a rubber tree.

A big improvement in the new 600 is the carburetor that has been redesigned to squeeze a couple of extra miles out of each gallon of gasoline. At average speeds the 600 will give between 25 and 30 miles to a gallon. This puts it a good five miles ahead of its closest rival among the big three of the popular-priced cars.

Addition of an overdrive, or third-speed acceleration gear, has greatly improved the 600's performance. The 82-hp engine is basically the same as the L-head, six-cylinder motor in previous models. Since the 600 is a full-sized, 2800-pound car, 82-hp just isn't very much for an American car of this size.

Naturally, the small engine is the reason for the great Nash economy. Owners weren't too happy about the ice wagon performance that always made them last in the breakaway from a traffic light. The final, or fourth, gear is about the same as before. With the overdrive, now you can drop back a notch to a lower third gear for a fast start by merely pushing the accelerator down to the floor.

This has pepped up the 600 so that it's no longer a dog on its feet. It still isn't a bearcat in performance but it's definitely far away from [*Continued on page* 95]

The new 600 has better lines and gets more miles to a gallon than the '48 model, behind McCahill.

How to Bend A PRETZEL

Want a bite? Plenty of pretzel here for a neat treat—if you can unbend it.

Glass courtesy The Bar Mart

Right at the start, you must throw in the "sponge," or pretzel dough, before you can do any bending.

Twist of the wrist bends the pretzel. Worker at Sturgis Bakery, Lititz, Pa., twists 5000 a day.

Pretzels plop into the hot vat at the left, come out clad in their characteristic glossy finish.

After draining, the pretzels are lined up on this long wooden board and sprinkled heavily with salt.

Paper, tossed inside to test the oven, flames up and shows it's hot enough to brown the pretzels.

Fresh-baked pretzels are scooped into cellophane bags to keep 'em crisp till you're ready to munch.

NEW in SCIENCE

Gay Young Goat below, struts on front legs with head down and body straight up. Billy's hind legs were frozen soon after birth and then severed at the knee when a cow stepped on them. A month later, he was scampering around.

History In Silver: The war record of the 504th Parachute Infantry Regiment has been pictured on a silver trophy. On the dome, above, paratroopers are shown during the Battle of the Bulge. Below, silversmith puts cup atop the 80-pound memorial trophy.

House On A Boat, below, journeyed 12 miles by land and sea to its new location. The six-bedroom home of Roddy Burdine, Miami Beach, was moved on rollers, loaded on a barge and floated to Miami. Here, it is towed through Venetian Causeway.

Cash In Old Music Box

[Continued from page 81]

hunting, I also managed to track down half a dozen mid-Victorian song hits on old records.

Bankers and businessmen discouraged me when I talked to them about putting the music box back on the market. They doubted that the old music could stage enough of a comeback for me to convert my hobby into a small business. I was stymied, also, by a terrific shortage of records. With a little scratching around the country, I could dig up lots of music boxes—many of them treasured family heirlooms—but the records had vanished long ago. So, for years I had to continue my daily grind of selling groceries and leave the old music for strictly a spare-time hobby.

Music-box owners, though, heard of my hobby and, more and more, kept begging me to find records for them. Then I got my big idea—make the records myself and fill that pent-up demand for the old tunes.

Then I discovered that I'd need a small fortune, plus a lot of luck, to set up a factory for stamping out the discs. Even if I were lucky enough to find the old craftsmen who were skilled in such work—and that wasn't likely—I'd have to get costly machinery specially made up for my little factory.

It all looked pretty hopeless until one happy day three years ago when I met Maurice Chaillet of Rahway, N. J. Mr. Chaillet owned the master plates and machinery for the old Regina music-box firm, which the phonograph knocked out of active business at the turn of the century.

He was just as sentimental as I was about the sweet-tinkling melodies and liked the idea of resurrecting the old music-box tunes. He agreed to sell me the Regina machinery and plates for a small sum, on an easy installment plan.

I set up shop in Hanover, Mass., and gladly forgot all about my old grocery grind. That first year my plant production was limited to stamping out records from the old master plates.

Orders are pouring in from all over the world. My two assistants and I are working night and day to try to keep up with orders for White Christmas, Jingle Bells and other tinkling hits, old and new.

Maybe I won't make a million—but I've been feeling pretty good ever since I looked into that old music box in the Boston antique shop. Thanks to that music box, I've found new cash and a new business of my own, and learned what a hobby plus an idea can do. But, better than the business or the money, I found something I love—and I've never been happier than I am right now, working to the tune of my old music box. •

MI Tests the New Nash

[Continued from page 91]

its former snail class. After many trial runs on the Burlington proving grounds I found that in third (high gear but not overdrive) the 600 would go from 10 to 60 miles an hour in 22.1 seconds. In overdrive, top gear, the car moves from 30 to 60 miles an hour in 19.0 seconds. From 0 to 60 mph through gears, the time was 20.1 seconds. Top speed in high after buildup is 74 to 77 miles an hour. This is the actual top and would read 85 to 88 on many speedometers.

The new 600 should be especially appealing to those who use their cars in business and want real economy in operation. And the women ought to go for the comfort and smart looks. If you want zip-zip performance that will keep you out in front of everything on the road, this is not the car for you. The performance isn't outstanding but, considering the economy, the comfort and the ultramodern design, the new Nash 600 is one of the best buys in America today.

I drove the new six-cylinder Ambassador over many miles of rugged roads at the proving grounds and rammed it up tough, car-killing grades of 28 per cent. I'm glad to report that this 112-hp, overhead-valve chariot can climb a hill like a goat and skim over bumpy block roads like a sponge full of oil on ice. After warming up the Ambassador with this rough grind, I whipped it around the Nash track.

This car is remarkably agile and fleet, as the following figures, an average of many runs made, show: 10 to 60 miles an hour in high (third) gear in 20 seconds flat; in overdrive, 30 to 60, in 18.1 seconds, and from 0 to 60, through gears, in 17.4 seconds. The Ambassador is extremely fast footed on the getaway and has been a big winner in stock-car races. Maximum speed of this model varies between 86 and 89 mph. Again, this is actual speed, not merely a speedometer reading. The car handles beautifully even at high speeds—a major factor in its racing success.

The Ambassador is a top-flight, luxurious car that can cruise over the road at speeds higher than anyone in his right mind should want to go. In view of all the features offered in this car—such as looks, roadability, performance, interior comfort and last, but far from least, the bed feature—I don't know of a better dollar-for-dollar buy in its class than the Ambassador.

Both cars are standouts in looks, luxury and riding ability. After proving the quality of each in grueling road tests, I feel the major auto companies had better start looking to their laurels. They won't outdo these two numbers by feeding the public any more milk-toast models. •

Can Sea Farms Avert World Famine?

[*Continued from page* 67]

untapped food sources in the seas where photosynthesis works incessantly. Many seaweeds are edible, even when untricked by the remarkable chemical treatment of Doctors Calvin and Benson. Dr. Josephine T. Tilden of the University of Minnesota has classified some 2500 varieties of algae and found at least 400 of them good to eat. In our country, seaweed has had some limited medical use as a goiter preventive and bulk producer, but elsewhere seaweed is more valued as a food.

Captain John Craig, noted Hollywood underseas photographer, has told of an astonishing underwater adventure off the coast of lower California. In his heavy diving suit he found himself trapped in a weird, waving, purple forest 30 feet under water. He was extricated by another diver who appeared mysteriously. It turned out that his rescuer was a Japanese who cultivated an underwater sea farm. The purple weed was sargasso which they harvested and shipped to their homeland for a tidy profit.

The first tentative steps toward production of test-tube protein have already been taken. Dr. Robert B. Woodward, the Harvard chemist who synthesized quinine, has succeeded in making amino acids link together in long chains that constitute protein molecules. The proteins "manufactured" by Dr. Woodward have been made into silk-like threads and thin plastic films. They are definitely not good to eat. But milk and eggs, meat and fish, cottage cheese and gelatin are largely made from amino acids forced to link into protein chains by animal metabolism. What chemistry has achieved is merely the first step of a long, long journey toward fascinating unknowns.

Test-tube meats would not solve the world's hunger in any real sense, for the raw materials—amino acids—are largely obtained from sources which themselves can serve as foods. Seaweed protein factories could provide amino acids that might be whipped into much more palatable form by an extension of Dr. Woodward's techniques.

Cattle, and indirectly, man, can be nourished on wood wastes. It is not a case of boiling shingles but of treating wood cellulose (sawdust, shavings, splinters) with weak acid to produce a form of sugar. The Germans produced a good cattle food from wood during the recent war. It could be used just as successfully as a growing medium for yeast. One ton of wood waste would yield 500 pounds of yeast. Instead of sugar, wood wastes could be converted into ethyl alcohol of a quality indistinguishable from that in choice whiskies. Some 10,000,000 tons of sawdust go to waste in this country every year. It could be made to yield 2,500,000 tons of highly nutritive yeast, or more than 30 pounds of first-rate protein and B-Vitamin food for every person in the country.

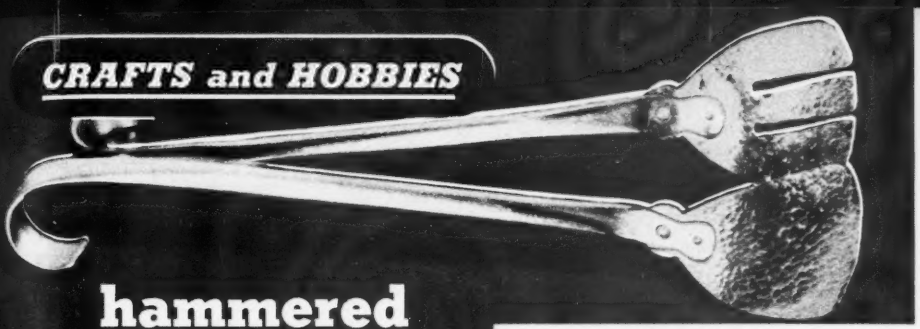
Much can be done to enrich human diets by concentrates such as Multi-Purpose Vitamin Food, called MPV for short. It's distributed as a food supplement, especially in protein-hungry Europe. On diets largely limited to cereals and vegetables, MPV adds protective factors furnished by unobtainable meat and milk and eggs. MPV is a taffy-colored soluble powder that can be stirred into soups or added to other foods in a multitude of ways.

Calcium is a vital mineral that is deficient in many diets. The richest common source is milk, but the world definitely does not produce a quart for every Hottentot. You could, however, get plenty of calcium by eating eggshells.

Bones are largely wasted except for occasional use in a soup kettle. Yet bones are not only crammed with calcium and phosphorus, but have considerable fluorine, an essential for development of teeth that will resist decay. Cooking for sufficient time under pressure will soften good-sized bones so they can be mashed into a pulp that is a teeming treasure house of food minerals. Primitive man, who is thought to have been a pretty husky animal, was a bone-gnawer and cracker, as evidenced by refuse piles unearthed in ancient caves. His teeth wore down, but they rarely decayed.

In a pinch, you could subsist for a while on weeds from your own back yard. You might even thrive better than on highly processed foods. A survey of the Otomi Indians of Mexico revealed scarcely any signs of dietary deficiencies. But what did they live on? Whatever was at hand: wild mustard flowers, purslane, maguey, yucca, pigweed, sorrel, cow thistle and cactus fruits. Other primitives are partial to insects. Bushmen consider termite eggs in a class with caviar, and a large white grub obtained from coconut palms in the West Indies is said to taste much like chestnuts when roasted. A Siberian tribe relishes the worms they pluck out of the festering sores in their reindeer.

In the long run, we are up against the law propounded by Thomas Malthus two centuries ago: the world's population tends to increase faster than its food supply. We cannot endlessly increase the lands that feed us. Let us fervently hope that the discoveries of Doctors Calvin and Benson, and others like them, may soon open up major new supplies of food from such abundant sources as seawater and sunlight, and thus save us all from the coming famine. •



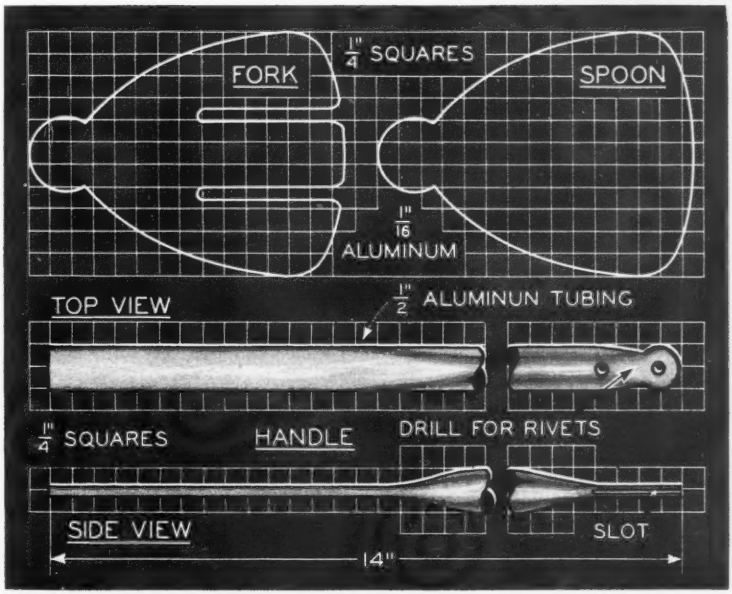
hammered aluminum SALAD SET

Above: A tin snips is used to cut out parts for fork and spoon. Below: rivets are inserted in slots cut in handles and then peened from the back. Polish with scouring powder and steel wool.

EVERYBODY likes salads. If you serve them with a fork and spoon of your own making, your guests will not only appreciate the culinary ability of your wife, but also your own mechanical skill.

To serve the salad and receive the compliments of your guests, you will need a piece of aluminum about 4x6 in. and two pieces of ½ in. aluminum tubing, 14 in. long. Four aluminum rivets complete the material list.

Draw the spoon bowl and fork patterns on the sheet of aluminum and then cut them out with a pair of tin snips or a coping saw. Drill [*Continued on page* 140]



For good looks and good performance you can't beat this 16-inch electric motor driven model boat. Build it and see.

By Douglas Rolfe

DESIGNED especially for easy building, the MI Elf not only possesses the smooth lines of a Chris-Craft runabout but performs equally well for its size. Unusual in that the power plant is a miniature electric motor powered with ordinary flashlight batteries which will operate the motor for hours at a time, the modeler is assured of the ultimate in constant performance.

The hull is built of balsa wood throughout. Start work by cutting out the frames which should be laid out full-size to the dimensions given in Fig. 2. Trace the full-size outlines on a sheet of 1/8 in. balsa and cut out carefully. Note that all frames extend to the base or building line as the hull is built upside down. Set the seven frames and the stem piece up on a 1x6x20 in. white pine board, spacing them as shown in Fig. 1. Next cement the chine, sheer and keel stringers into their respective notches, taking care to keep frames true. While the cement is drying, anchor the entire structure to the building board with a few strips of cellulose tape. If these directions are followed a perfectly true, accurately lined and strong framework will automatically result. Now remove the tape and bevel the keel to the frame lines. Sand the chine and sheer stringers similarly. Bottom planking is laid first. It is best to make a thin cardboard pattern for these pieces. One pattern will suffice as the bottom is cut from two identical pieces of $\frac{1}{16}$x2 in. sheet balsa which is joined at the center of the keel. Start securing the bottom pieces at the stern and work gradually forward. Stop cementing at about frame No. 2 and

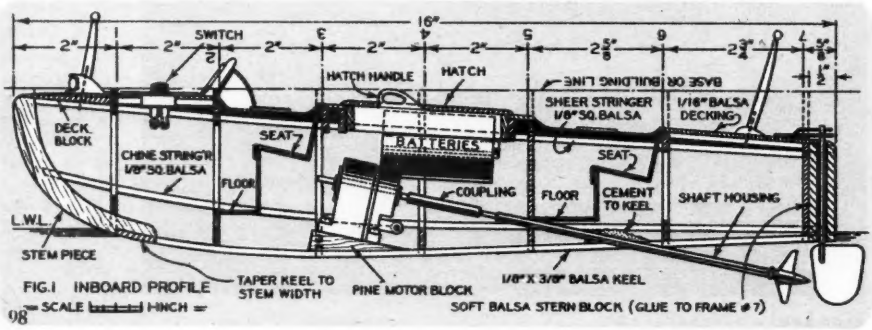


FIG. 1 INBOARD PROFILE

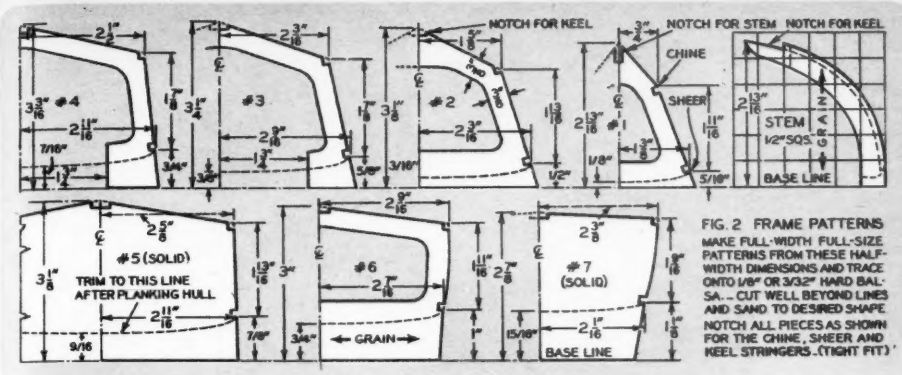


FIG. 2 FRAME PATTERNS
MAKE FULL-WIDTH FULL-SIZE PATTERNS FROM THESE HALF-WIDTH DIMENSIONS AND TRACE ONTO 1/8" OR 3/32" HARD BALSA. - CUT WELL BEYOND LINES AND SAND TO DESIRED SHAPE. NOTCH ALL PIECES AS SHOWN FOR THE CHINE, SHEER AND KEEL STRINGERS. (TIGHT FIT)

allow the cement to dry thoroughly before putting in the bend to the stem piece.

With the bottom in place, trim the chine edge flush and sand gently to the chine line. The side planking can now be laid. This requires no patterns at all. Simply take a piece of $\frac{1}{16}$x2 in. sheet balsa and bend it around the framing. When the cement is dry, trim off to chine and sheer lines and repeat the process on the remaining side. Remove the hull from the building board, run in plenty of cement along all seams inside the hull and hold the planking together with a number of strips of cellulose tape applied to the outside of the hull. Use strips at each frame station, in be- [*Continued on page* 138]

FULL SIZE PLANS

will make building easier. Send 25 cents for your set to: MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Connecticut. Please specify Plan No. 394.

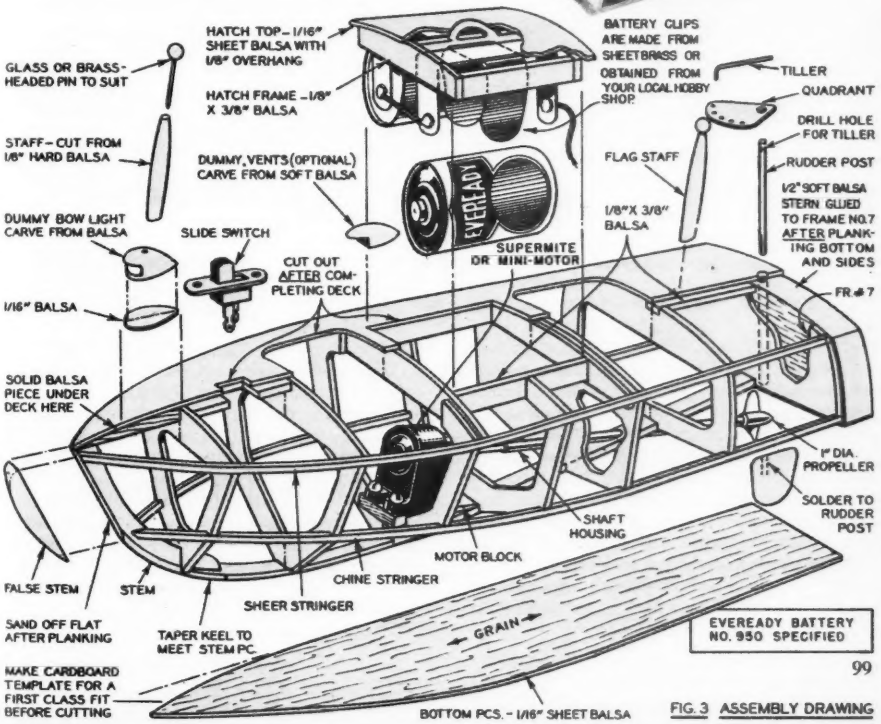


FIG. 3 ASSEMBLY DRAWING

Don't be caught short if a few guests show up unexpectedly—be ready with this food locker.

Home Deep Freezer

PART I

MI presents a master project that'll appeal particularly to the farmer and his family.

By John P. Arnold

THERE is little doubt, since the womenfolk confirm it, that a home freezer for food storage is a requisite for modern, economical living. Ask any housewife who owns one—or who doesn't own one. Having accepted this proposition, MI's collective editorial brain has been churning a related question: can the craftsman without specialized skill or tools build his own food locker, one which will compare favorably with any on the market today? The answer, according to a careful survey, is "Yes."

To substantiate this, MI presents complete workshop plans for a freezer that will equal, perhaps exceed, some commercial products in performance and economy, and do this at about two-thirds of the cost of the latter.

This was designed by Roy Beans, a refrigeration engineer of New Hope, Penna.. who in the past has built similar ones by home-workshop methods and now makes home and farm lockers from the smallest sizes up to cold rooms large enough to stand in. Our freezer has a ca-

FIGURE 1

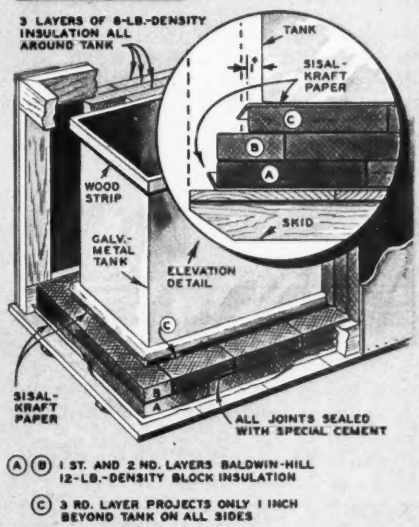


FIGURE 3

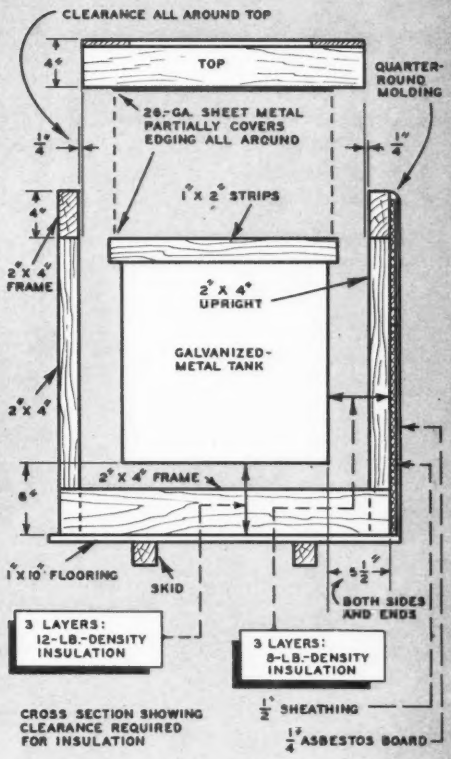


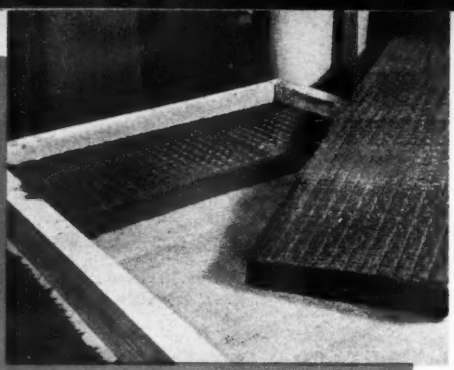
FIGURE 2

pacity of 16 cu. ft., which is about twice that of the average refrigerator—a size Beans considers suitable for a suburban family of four.

The problem of size may perplex anyone who buys or builds a freezer. If it is impossible to fill a box of from 12 to 16-cu.-ft. capacity by judicious in-season buying or by storing garden produce, there is perhaps no economic reason for having a freezer at all. Such lockers hold from 420 to 560 lbs. of food. While this may seem more than ample, the basis for selection is this: 8 cu. ft. per person for farm families, 4 cu. ft. per person for city or suburban homes.

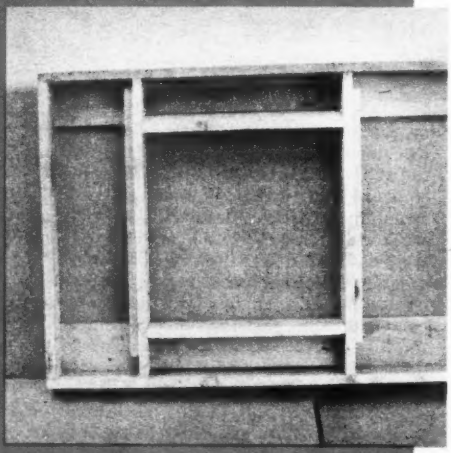
Thus our specifications are for a locker that will quick freeze at —10° F. and store foodstuffs at 0° in quantities sufficient for the needs of a typical family. It will be noted from the Bill of Materials that this freezer will cost approximately $360, which may be compared with commercial freezers of equivalent capacity selling from $525 to $600. Possibly $50 or more can be deducted from this figure by omitting some refinements and by the possibility that the craftsman has (or can buy) the lumber, metal, motor, etc. at less than the given costs, which are top-of-the-market quotations.

The construction begins with making the storage compartment, consisting of body, top, and lids or hatch covers. These are built separately and assembled. The galvanized tank (Fig. 1) should be made



When installing the blocks of insulation, fit them carefully and tightly together.

Aquaseal, a special compound, odorless and joint-sealing, is put on the blocks.



View of the inside of the freezer top is to show insulating material set in place.

before starting the framework, as all dimensions are taken with reference to it. Wood strips are nailed around its upper edges (Fig. 2) on which to rest the top. Use galvanized fastenings for this and all other box construction. In this case, drive the nails from the inside of the tank and clinch them over the strips.

Study Fig. 2 closely before beginning the work; then build the framework to provide the indicated clearances between the tank and the outer faces of the frame. The 8-lb.-density insulation used around the sides is readily compressible, but the 12-lb. material placed under the tank will not compact; therefore the vertical height of the outer frame of the body is quite important. The top must fit within it so the frame is flush with its upper surface when it rests on the tank.

Two identical mitered frames are required for the body (Figs. 4 and 5). The base frame has a flooring laid with butted joints and nailed to the framework. The boards extend slightly beyond the frame on all sides to form a step on which the side sheathing will rest. The underside of this base should be creosoted as a protection against dampness.

The uprights are cut to length and toe-nailed in place with the second frame resting on top of them. Temporary diagonal braces will be required to keep the structure square until the outer sheathing is nailed on.

Three layers of the 12-lb.-density insulation, which comes in 2x12x36-in. blocks, are built up within the frame (Fig. 3). First, a piece of Sisalkraft paper is cut a trifle larger than the inside area and laid on the flooring, turning it up around the edges.

The method of laying the blocks is quite simple. They are easily cut to length with a handsaw and placed crosswise in the frame. The joints between the blocks are closed by troweling on Aquaseal, an odorless sealing compound. The first block in the second layer should be sawed in half longitudinally and one of full width laid next to it. This avoids joints in a line through which warm air might conceivably filter.

The third layer of insulation and the Sisalkraft paper placed on top of it do not extend to the sides of the frame, but are cut merely an inch longer than the bottom of the tank on all four sides.

The tank now can be placed within the framework and centered and braced in position, leaving a clearance of about 5½ in. all around. Building up the side insulation and placing the outer sheathing and

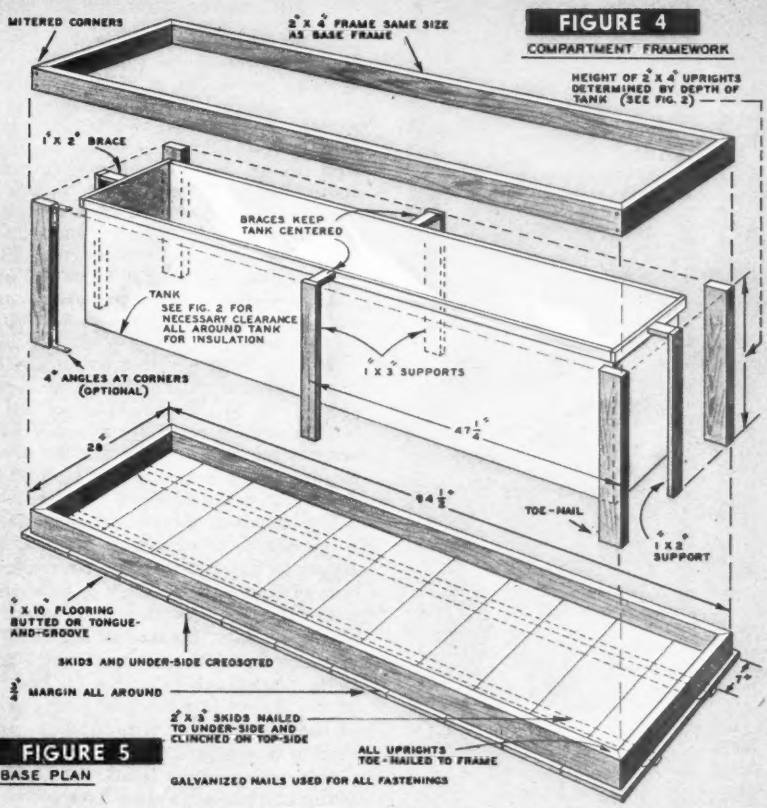


FIGURE 4
COMPARTMENT FRAMEWORK

FIGURE 5
BASE PLAN

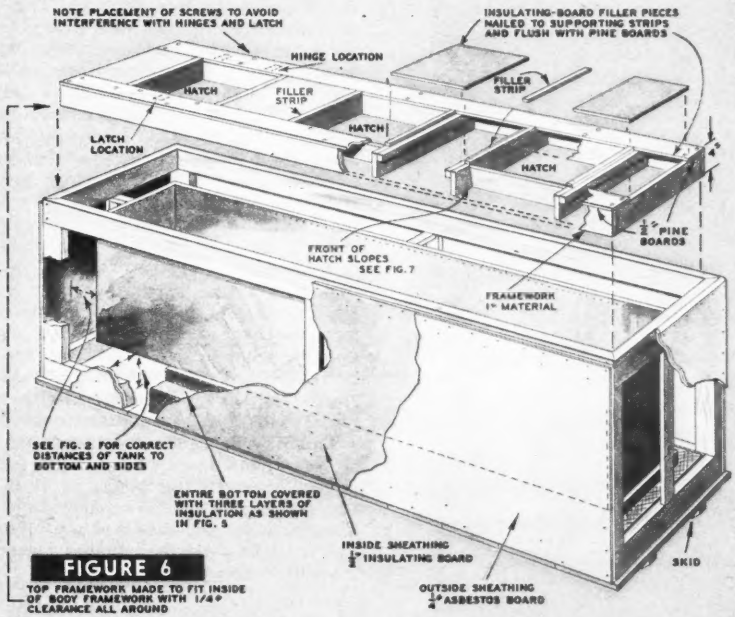
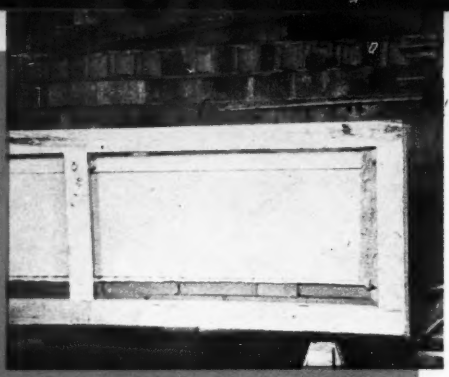
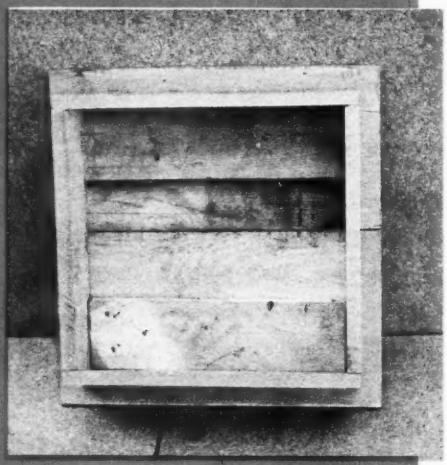


FIGURE 6
TOP FRAMEWORK MADE TO FIT INSIDE OF BODY FRAMEWORK WITH 1/4" CLEARANCE ALL AROUND



After the tank is centered in the frame, the sheathing is nailed around the sides.



Note the filler blocks inside the lid to provide purchase for the hardware screws.

After packing the cover with insulation, seal it with 26-gauge galv. sheet metal.

asbestos board should be done as one operation, taking one side at a time (Fig. 6). The first layer of 8-lb. insulation is placed against the inner side of the sheathing; then the two interior layers are inserted. This insulation should be well packed, but no sealer is required. It should be built up slightly higher than the upper edges of the tank so the top, when put in place, will compress it a trifle. The sheathing is stopped within ¾ in. of the top of the framework, allowing this margin for the quarter-round molding over which the sheet-metal top will be rounded.

The top must be fitted within the body with only a slight clearance c the four sides (Fig. 6). Thus it is important that both units are carefully squared, otherwise fitting will be difficult. The over-all depth of the top also should be held close to 4 in. in order to avoid trouble.

The top is a covered framework with three 16x16-in. openings or hatches for access to the interior. The covering consists of thin boards (later to be sheathed with metal). The interior is filled with blocks of 8-lb. insulation that are held in place by a 26-ga. sheet metal nailed to the framework (Figs. 6 & 7). The edges of this sheet should extend to the centers of the strips fastened around the upper margin of the tank (Fig. 2).

Note also another detail: the front sides of the hatches are sloped from top to bottom (Fig. 7). This slope conforms with the slope of the lids (Fig. 9). This is to provide sufficient clearance when the lids are opened. The craftsman who wishes to avoid the considerable expense of the standard hardware can build all sides of the lids and hatch openings square. In this case, the lids must be lifted out. This is not a great inconvenience, as freezers are not opened as frequently as a refrigerator. If the locker is hidden away in a basement, a counterweight arrangement, although unsightly, such as shown in Fig. 8, will make removal easier.

If hinges are used, the filler blocks shown in Figs. 6 and 9 should not be overlooked; they are necessary to provide enough wood so the screws will not pull out. The lids themselves are made of rough lumber and covered with sheet metal with 8-lb. insulation in between.

This completes the woodworking construction, but the top is not yet permanently fixed to the body, as it is still necessary to install the refrigerating coils. This work and the details of setting up the unit will be described in the December issue of MECHANIX ILLUSTRATED. •

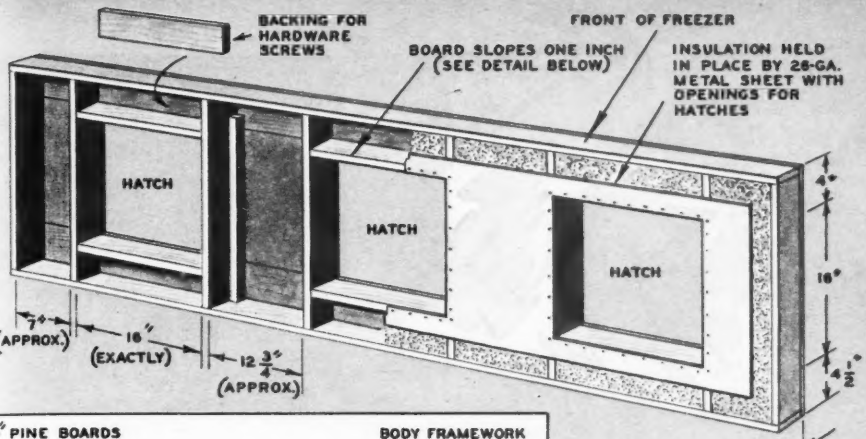
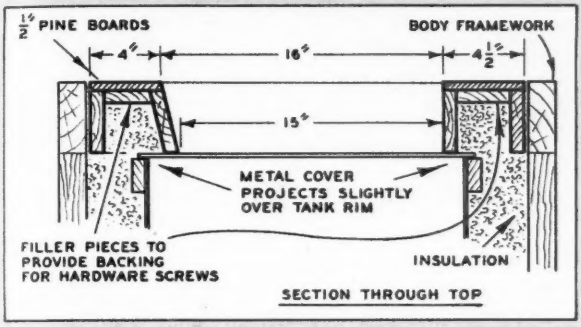


FIGURE 7

UNDER-SIDE OF TOP



SECTION THROUGH TOP

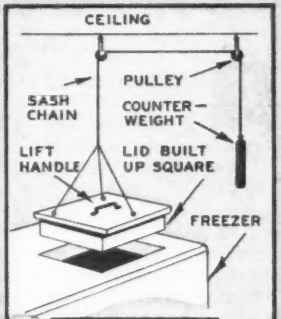


FIGURE 8

SUBSTITUTE ARRANGEMENT ELIMINATES COST OF FREEZER HARDWARE

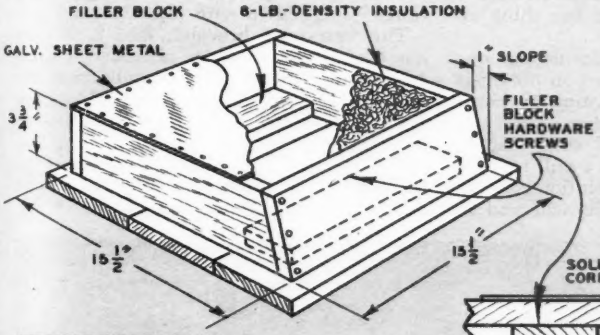


FIGURE 9

DETAIL OF HATCH LID

BILL OF MATERIALS

Estimated Cost	
$ 30.00	Block insulation: 2½ cartons, 12-lb. density; 1½ cartons, 8-lb. density
12.00	Lumber: ½" and ¾" pine, fir, etc., and two-by-fours
25.00	26-gauge galvanized sheet iron
27.00	Hinges and latches, 3 pairs
7.00	½" asbestos-impregnated fiber board, 3 sheets 3'x8'
9.00	⅛" hard asbestos board, 65 sq. ft.
10.00	Aquaseal, solder, Sisalkraft paper, rubber gasket, etc.

Estimated Cost	
$157.00	Refrigerating unit, less motor
15.00	Expansion valve
35.00	Motor, ⅓ hp.
7.00	Dryer or dehydrator (silica-gel type)
28.60	130', ½" o. d. seamless copper tubing
$362.60	TOTAL

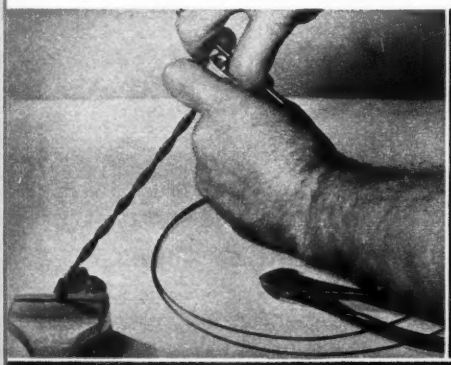
For list of suppliers of above materials, send request and stamped, self-addressed envelope to MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, New York

By Bill Luther

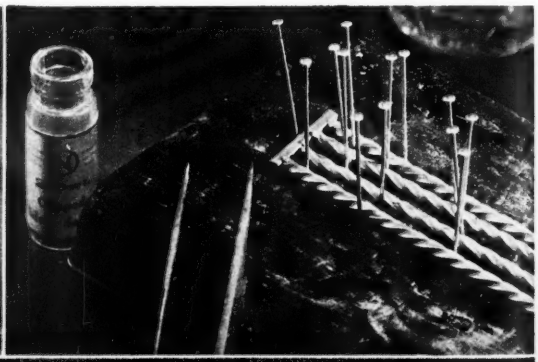
FOR bracelets made from wire—plain or twisted, square or round, with loops or scrolls—silver and copper are excellent mediums in which to work. Three typical bracelets are detailed here—with a little imagination you can think up countless variations.

Simplest of the three is the copper one shown in Fig. 1. If the wire you obtain is insulated, remove the insulation by hammering with a wooden mallet. Also, you must remove the "tinning" coat. This is done by heating the wire to a dull red and plunging it into a pickling solution consisting of one part of sulphuric acid and 10 parts of water. Then make the bracelet by following the procedure shown in the drawing. The ends are joined with a flake of silver solder and the finished piece is buffed—first with tripoli, then with jeweler's rouge—and coated with clear lacquer.

The four-wire bracelet, Fig. 2, is also made of copper. Pickle, as above, before fabricating. When assembling, alternate the right and left-hand twists. After adding the rectangular pattern, buff and lacquer as described above. The outside frame of the silver bracelet, Fig. 3, is made from a 12¼-in. length of square stock. The four scrolls are formed with round-nose pliers. •



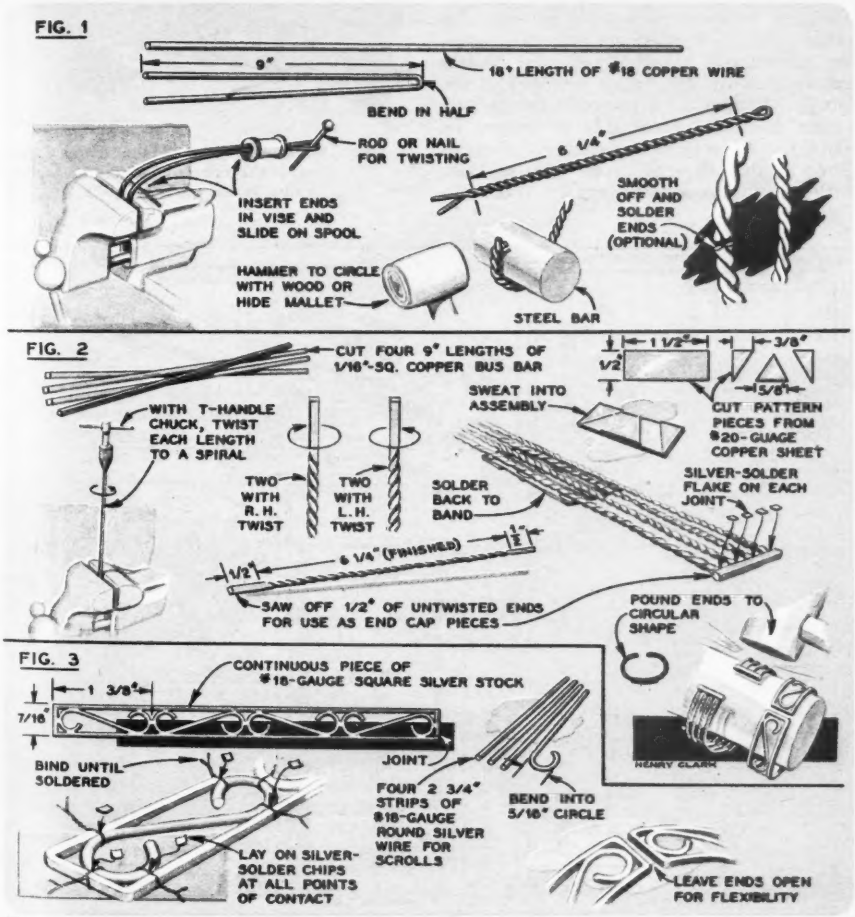
When twisting the square bus bar, clamp one end in a vise and the other in a T-head tap holder. Twist the stock until a tight spiral is formed.



Hold the component pieces of this bracelet in place on the soldering block with steel pins while they are being joined together.

Another method of holding the pieces in place while they are soldered involves binding them together with bits of 26-ga. black-iron wire.

After soldering, the bracelet is formed to fit the wrist by placing it over a piece of pipe or bar stock and hammering it with a soft mallet.



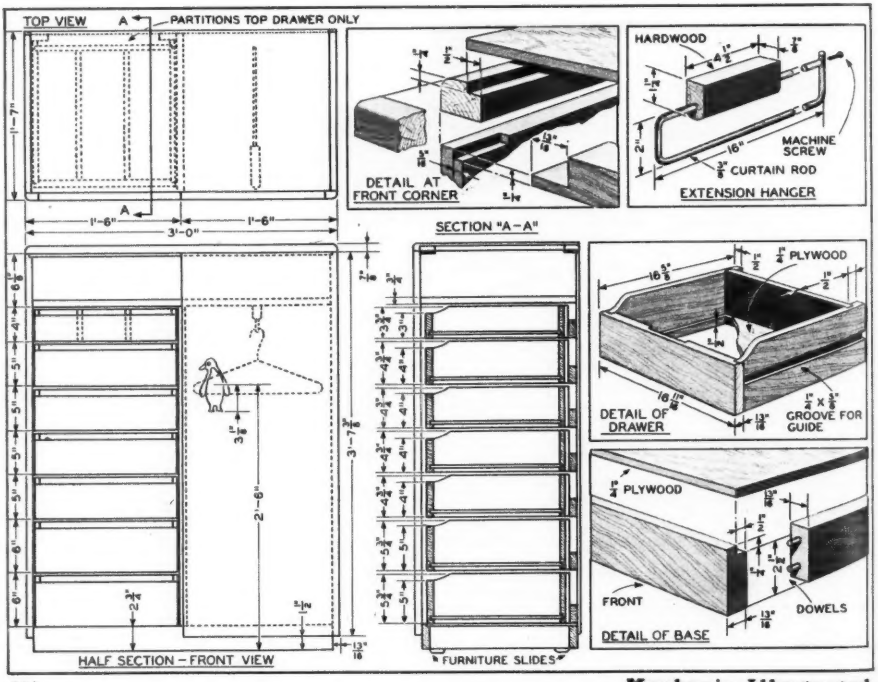
TOT'S CHIFFOROBE

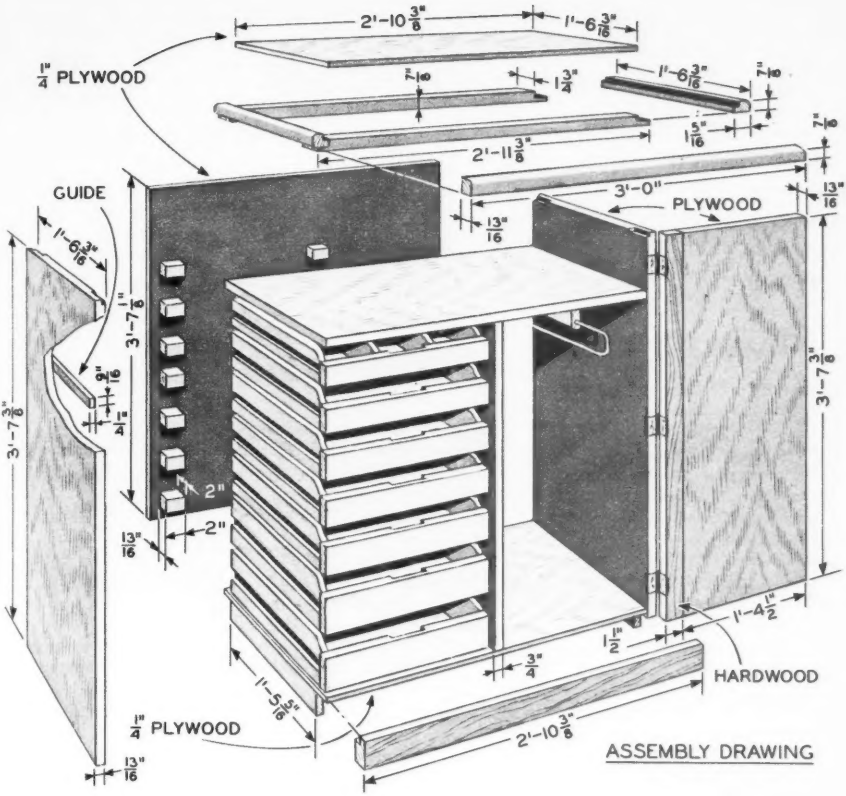
To foster neatness, give a child scaled-down storage facilities.

By Harrison Neustadt

NO matter how many closets you now have (and who ever had enough?), this functional chifforobe will be a welcome addition to your storage facilities. The easily accessible, spacious drawers, hanging space, and hat shelf will be greatly appreciated by the junior member of the family. Incidentally, the only things "juvenile" about this piece of furniture are the handles. An alternate design for these is given so that the chifforobe may be used without embarrassment by the more so-

Seven drawers, hidden away behind one of the doors, provide space galore for the junior glamour girl's fine silks.



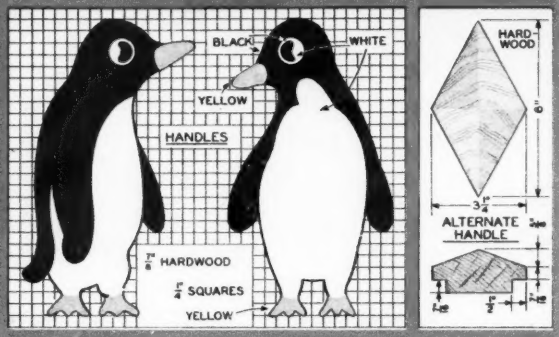


phisticated child or even by an adult. (The hanging space is high enough to accommodate grown-up's suits, blouses, sport shirts, etc.)

First, make the base, completely assembling it as a unit. The front piece is $\frac{13}{16}$x2¾x34⅜ in. and has a ¼x½-in. rabbet along the inside top edge. Each of the two side pieces measures $\frac{13}{16}$x2½x17$\frac{5}{16}$ in. and the back is $\frac{13}{16}$x2½x32¾ in. Assemble these four pieces with glue and dowels, as shown in the detail. Atop this assembly goes a piece of ¼-in. plywood measuring 17$\frac{13}{16}$x34⅜ in. It is glued and bradded in place; then, if necessary, dressed down flush with the side and back pieces.

The $\frac{13}{16}$-in. plywood sides are next added. Each of them is 18$\frac{3}{16}$x43⅜ in. and has a ¼x½-in. rabbet at the back and three gains cut at the front to receive hinges. The bottom of each is positioned 1½ in. above the bottom of the base and they are secured with screws driven through the base into them. Install the vertical partition mid-

For the young sophisticate, the diamond-shaped handles at the far right might be preferable to the artless penguin design.



way between the two sides. It is made of ¾-in. plywood, $17\frac{5}{16}$x38¾ in. over all. Screwed to it is the ¾-in. plywood hat shelf. This piece measures $17\frac{15}{16}$x34⅜ in. and is attached to the side panels by means of dowels.

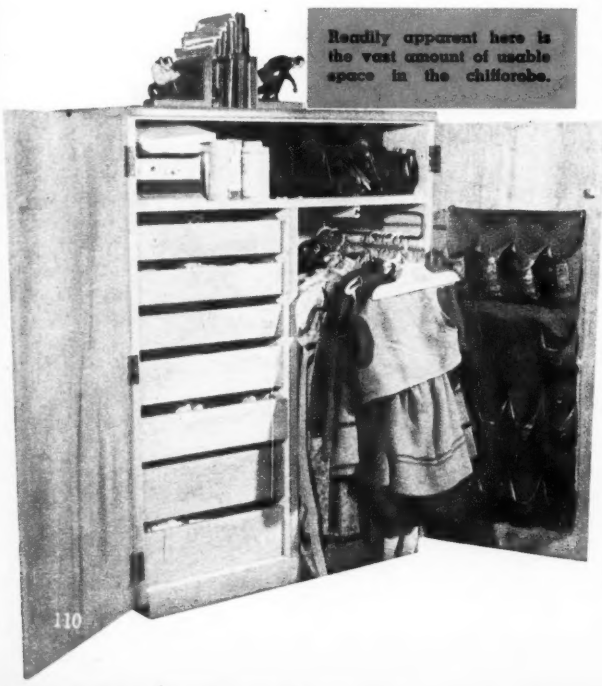
Horizontal stretchers are next added between the tops of the side pieces, front and back. Each measures ⅞x1¾x35⅜ in. and has a ⅝x$\frac{13}{16}$-in. notch cut out of each end. They are screwed down into gains cut in the sides. On top of the side pieces, lying in the notches in the stretchers, are two ⅞x$1\frac{5}{16}$x$18\frac{3}{16}$-in. rails. Each has a ¼x½-in. rabbet to receive the ¼-in. plywood top, which is $18\frac{3}{16}$x34⅜ in. over all. A facing piece, $\frac{13}{16}$x⅞x36 in., is glued in place along the front.

A detail is given for the drawers, which are of conventional construction with $\frac{13}{16}$-in. fronts, ½-in. sides and backs, and ¼-in. plywood bottoms. The sides have ¼x⅝-in. grooves to take ¼x$\frac{9}{16}$-in. hardwood guides, which are nailed and glued to one side panel and the center partition. The top drawer is divided into three equal parts. A 4-in. blind chamfer is cut in the top inside edge of each drawer front for finger room.

Make the two doors from $\frac{13}{16}$-in. plywood, 16½x43⅜ in., and glue $\frac{13}{16}$x1½-in. strips to the outer edges. Jigsaw the penguin-motif handles from ⅞-in. hardwood and paint on the designs. They are attached with screws driven from inside the doors. As mentioned before, an alternate detail is given in case you don't want penguin handles.

The extension hanger is bent to shape from a ⅜-in. curtain rod. It slides on a hardwood block that is bored to receive it, as detailed.

Round off all the corners of the finished piece, using a block plane or a spokeshave; then sand thoroughly. If open-grain hardwood has been used, fill the pores with paste wood filler (see MI, July, '48, for procedure). Finish with a minimum of three coats of varnish or lacquer, sanding lightly between coats. Rub down the final coat with steel wool, using a fine grade and being careful not to rub the finish off; then apply a coat of wax and bring to a high luster with a cloth. •



Readily apparent here is the vast amount of usable space in the chiffarobe.

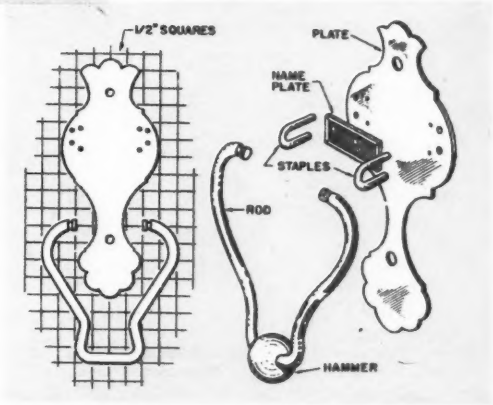
KNOCKER NAME PLATE *for your door*

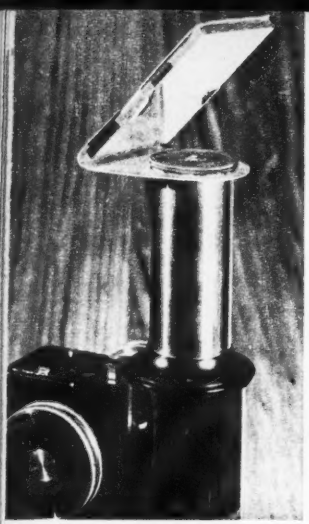
YOU don't have to be an expert metalworker to make this project. Almost any scrap metal can be used. If you use iron, paint the finished job. If you use brass, burnish it with steel wool and apply a coat of lacquer to inhibit tarnishing. The pattern for the plate is given on squares so you can easily make a full-size pattern. The hammer of the knocker is a solid spherical brass drawer pull. Drill it to take the ¼-in.-dia. rod. Slip the rod through it and bend to the proper shape, as shown in one of the photos. Grooves near the ends of the rod take two U-shaped staples, made of wire of suitable thickness. The ends of the staples pass through holes in the plate and are riveted in back. A small metal nameplate frame, purchasable at any hardware store, is also riveted to the plate, using brass escutcheon pins for the purpose. File down all rough edges prior to final assembly.

—*Bertram Brownold*

Shape the rod by hammering it around a 1-in. hardwood bending form, as shown in the photo immediately above.

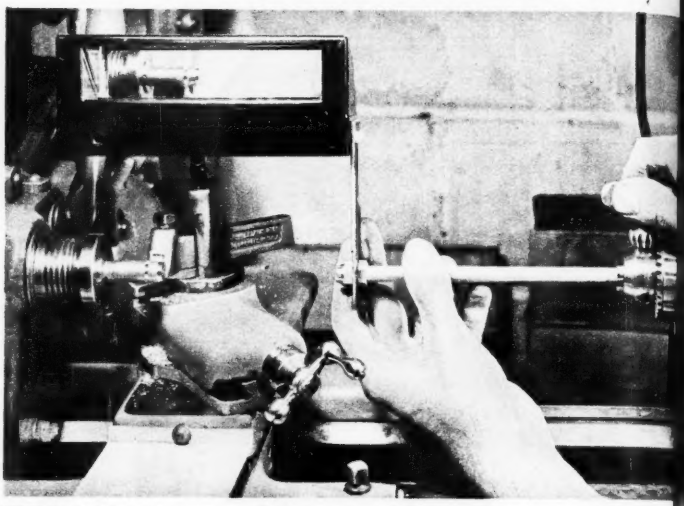
Above: Use a round or convex file for smoothing edges of plate. Below: The piece is both practical and ornamental.





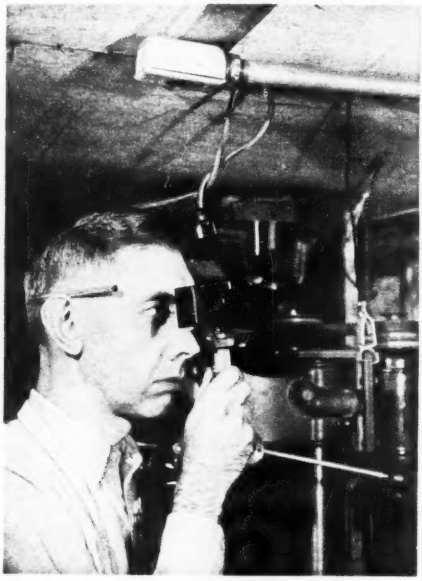
mirror magic

Put surplus tank periscopes to practical as well as mystifying applications.



A front surface mirror set-up on a microscope for horizontal projection.

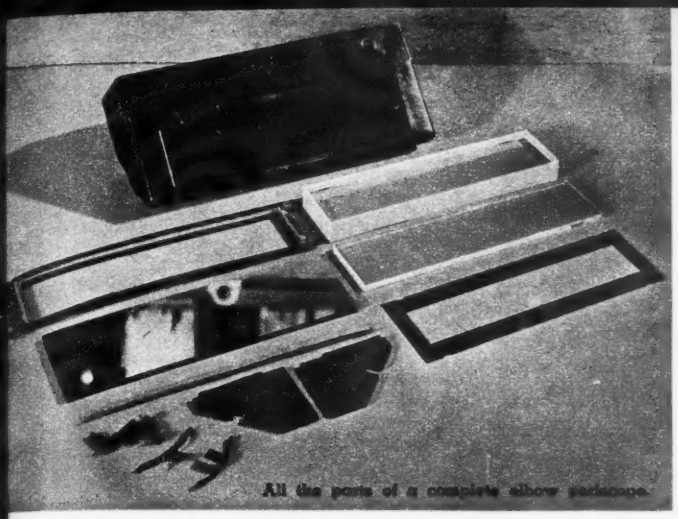
Right: This arrangement allows the observation of cut when tool is mounted at rear of post.



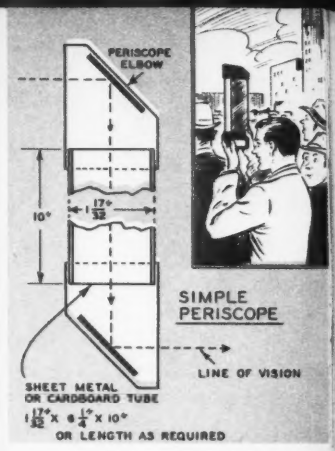
When equipped with a handle, a periscope mirror makes a handy device for the inspection of overhead equipment without giving inspector a crick.

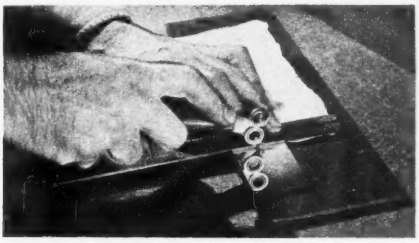
A front-surface mirror is one having the silvering on the front instead of the back. Light rays reflected from it do not have to pass through the glass, hence there is no double reflection often noticeable in a conventional mirror. If the silvered surface is optically flat, the front-surface mirror will reflect an image without distortion. It will be practically as efficient as a totally-reflecting prism. The silver coating is sometimes protected by a very thin coat of lacquer that has no appreciable effect on the mirror's performance. Use of a non-tarnishing metal (chromium or aluminum) in place of silver eliminates the necessity of lacquering.

There are many ways in which a front-surface mirror can be used in the home, shop, laboratory, or in photography. A few years ago, experimenters found it difficult and sometimes impossible to obtain such mirrors readily. Today, high-grade ones are available as war-surplus items. One of the most commonly encountered pieces of equipment in which such a mirror is found is the tank periscope elbow. You can buy an elbow assembly for about 40 cents.

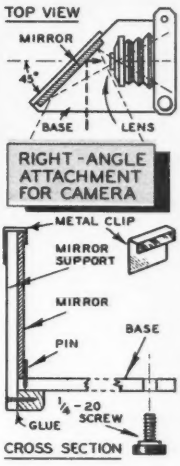


All the parts of a complete elbow periscope.



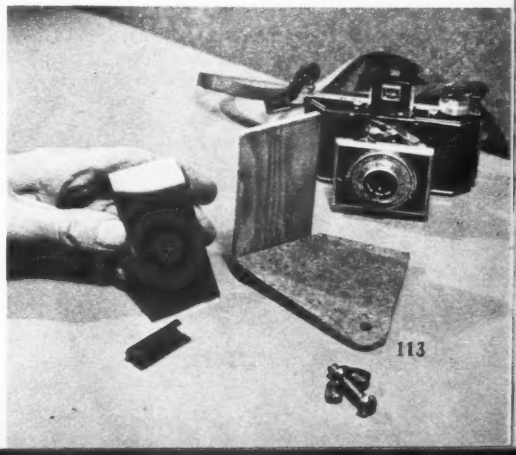


Cutting the mirror. Use a straight edge as a guide for cutter. Place a sheet of paper between guide and mirror to protect silver.



Above: In use as a right-angle camera mirror. Photographer looks through viewfinder and sees subject reflected as though appearing from left.

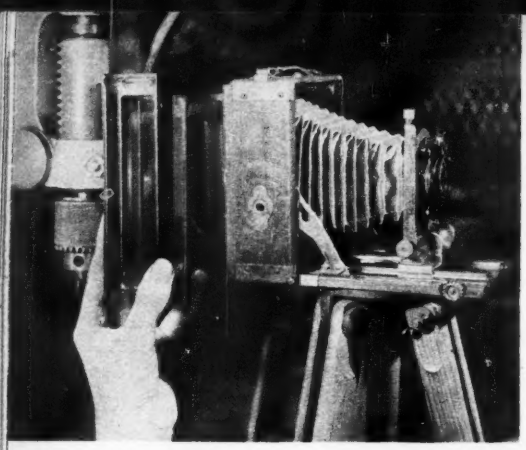
Below: All the parts needed to make the right-angle viewer shown in photo above. A ¼x20 bolt engages the unit to tripod socket of camera.

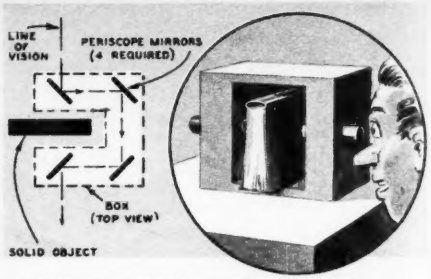


and from it obtain not only a first-surface mirror ⅛ in. thick and measuring about 1¾x5½ in., but you also can, upon dismantling the unit, salvage a number of other useful items; see the photo on top of this page.

The tank periscope elbow can be put to many uses with no modification at all, or by merely drilling a hole or two in the plastic housing. You can entertain your friends and get yourself fairly well confused by tilting the unit at an angle while it rests on a sheet of paper, so it reflects the point of a pencil you are holding in the writing position. While looking at the reflected image of the pencil point, try to write something that looks normal when viewed in the mirror. Actually, you have to write the word or sentence upside-down and reversed on the paper. This trick, called mirror writing, is used in psychological studies.

With two of the mirror units, you can make an excellent periscope that is useful for looking over the heads of persons in a crowd and over high fences. Simply

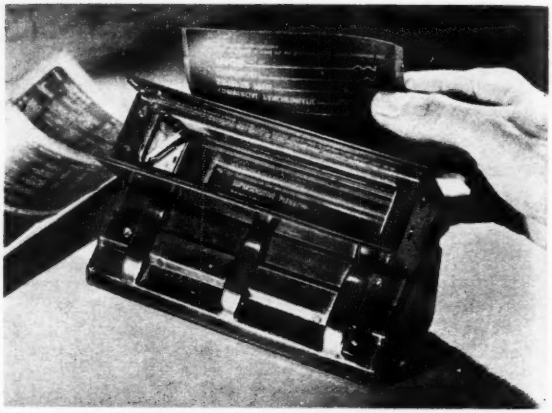




"LOOKING THROUGH" A SOLID OBJECT

You really can have a lot of fun with this Magic Box. With it, you can apparently look through solid objects. If you make it big enough, you can then easily insert your brother-in-law's head.

The periscope is a handy gadget for examining the ground glass when working in close quarters. Right: Image-reversing action of mirror is useful for reading paper negatives.



mount one unit a foot or so above the other, the mirror inclined as shown in the drawing. A tube of rectangular cross section, made from sheet metal or cardboard, will serve as a support for the mirror units.

The periscope action can be utilized in other ways. Four of the reflecting units can be arranged so light travels around a solid object while giving the illusion that the observer is looking through the object. Mounted out of sight inside a box, the mirrors can prove highly mystifying in this arrangement, which might form part of a magic show. A single reflecting unit fastened to the corner of a corridor wall will enable you to peer around the corner before moving on.

Uses for mirrors after removal from the elbow units, or of pieces cut from the mirrors, include the production of artificial reflections in a photograph by mounting the mirror horizontally in front of the center of the camera lens; making optical rangefinders and other optical instruments; and as movable scale-reflecting mirrors on galvanometers, etc.

The photographs show a number of applications of complete periscope elbows and of the mirrors alone after removal from their housings. •

You will find that a periscope elbow unit makes a very fine negative retouching stand. Place it on the table so that the light from a window or lamp is reflected upward by the mirror.

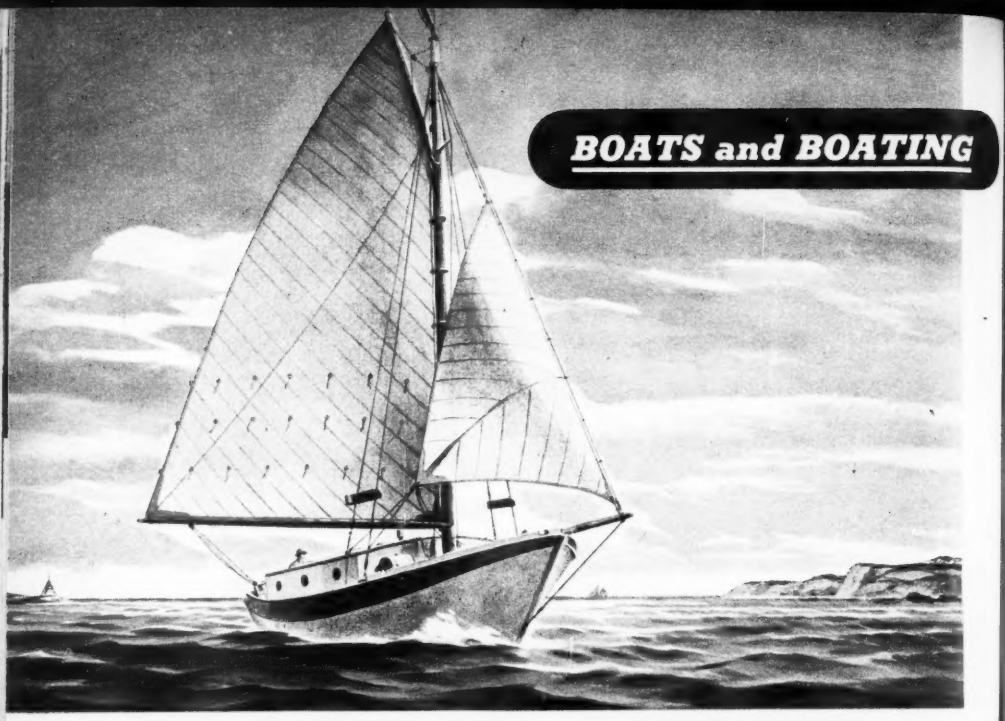
NEW Outboard-Motor Gear System

MOST outboard-motor users have suffered occasional inconvenience because their motors are permanently set in forward gear. They've wished for a gear system that would allow the motors to be thrown into neutral and reverse. The basic idea isn't new, but all transmissions for outboards in the past have been heavy and clumsy; so when John P. Guiler, President of Kattu Project, Inc., Forest Hills, N. Y., recently came to MI's Boating Editor and announced that his firm had developed a gear system that could be installed in a standard outboard without changing the size or shape of the engine or gear housing, and with a total added weight of but one to five pounds, we were skeptical. Mr. Guiler invited us to test and photograph an outboard equipped with his system—and we came away completely convinced. (That's MI's Boating Editor at upper left, looking pleased at the way the system worked.) With tomorrow's motors, you'll be able to start the outboard while still tied to a dock and stop the boat without killing motor. •

MI Photos by Bob Brightman

In both of these photographs (above and below) the motor is running. You'd know better than to try either of these stunts with your outboard as you'd be chopped to pieces by the whirling prop. But since the gear system has a neutral position neither man is running any risk of losing a limb.

Only visible evidence of the system is the small shift knob to which the arrow is pointing below.



LET'S GO DUTCH!

When it comes to roomy boats, we have to doff our hats to our cousins in Holland.

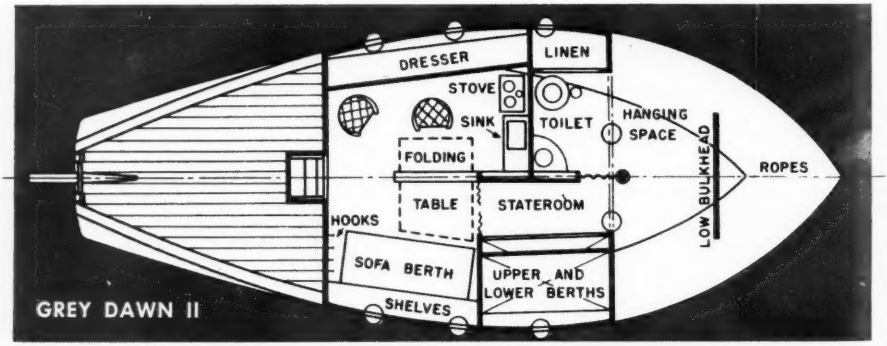
By Gerald Taylor White

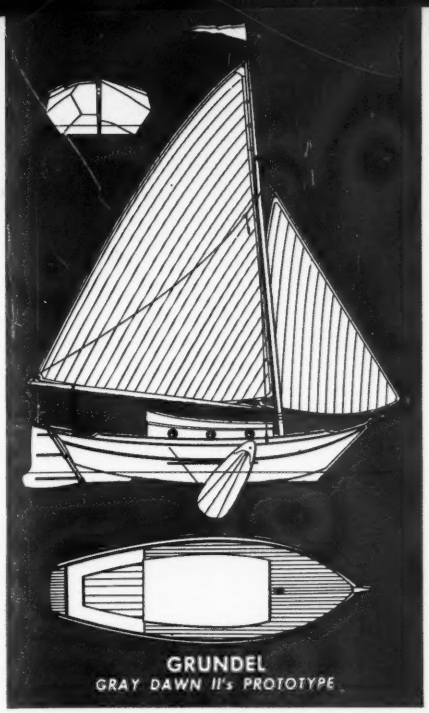
SCENE: *a boatyard in Brooklyn. In foreground, in final stages of completion amid a typical clutter of tools and shavings, is a 37-ft. auxiliary sloop. Two self-appointed "experts" are arguing vociferously as the curtain goes up.*

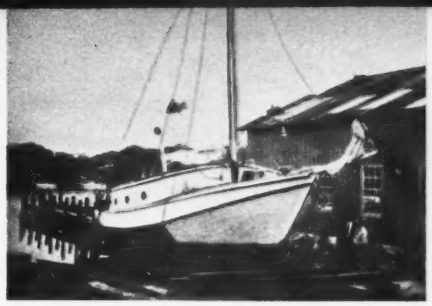
First Self-Appointed Expert: That boat'll turn over as soon as she's put in the water!

Second S.-A. Expert: You're crazy—I never saw a boat so obviously stable and comfortable. Why, I'd like to ship on her as crew for a trip around the world!

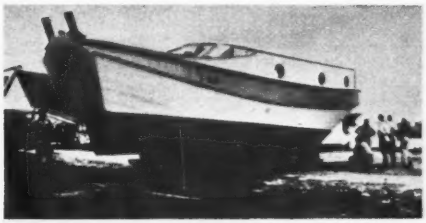
First S.-A. Expert (disgustedly): Around the world! Anybody can see she won't be







First of a line of Americanized Dutch yachts, "Grey Dawn II" was based on the Grundel, left. As is apparent in the painting on the opposite page, the family resemblance is strong. The wide, shoal, bluff-bowed hull, clearly evident in the photos above and below, allows a roomy cabin, as shown in the plan at the bottom of the opposite page.



worth a whoop outside of the calm waters of New York Harbor! She's so lightly constructed that she'll fall to pieces in the first rough weather she hits.

Second S.-A. Expert: Whatta ya mean? I never saw so strong a hull!

(They exit, still heatedly shouting at one another. Curtain.)

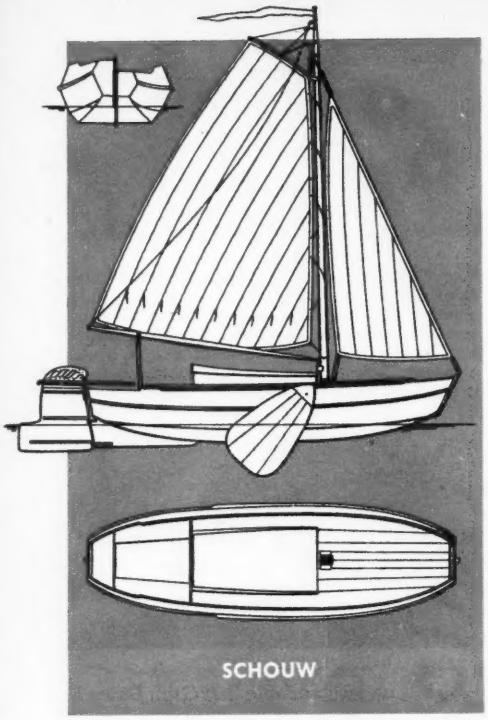
The boat being clamorously discussed in this dialog (which is a reasonable facsimile of the scores of conversations overheard while she was building) was *Grey Dawn II*, an Americanized version of the Dutch type of boat known as a Grundel. She was built in 1924 from plans prepared by Westlawn Associates, an American firm of yacht designers.

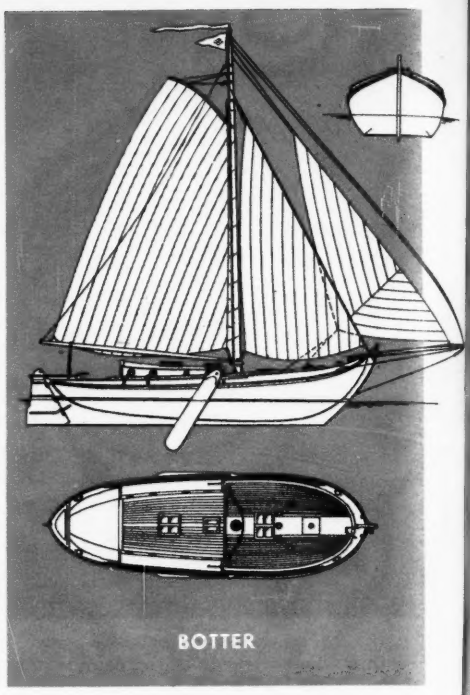
A Dutch boat was chosen as the model because of the many unusual and valuable features of boats originating in Holland. The geography of a nation dictates, to a great degree, the types of boats that, through years of progress, become more or less standardized. The waters where Dutch boats are used, and have been used for centuries, are of two distinct types. On the one hand is the notoriously rough and deep North Sea and on the other, the shoal and partially protected Zuider Zee. Thus Dutch boats must combine seagoing ability with shoal draft. These paradoxical requirements have resulted in craft that are wide, shoal, bluff-bowed, and exceptionally roomy.

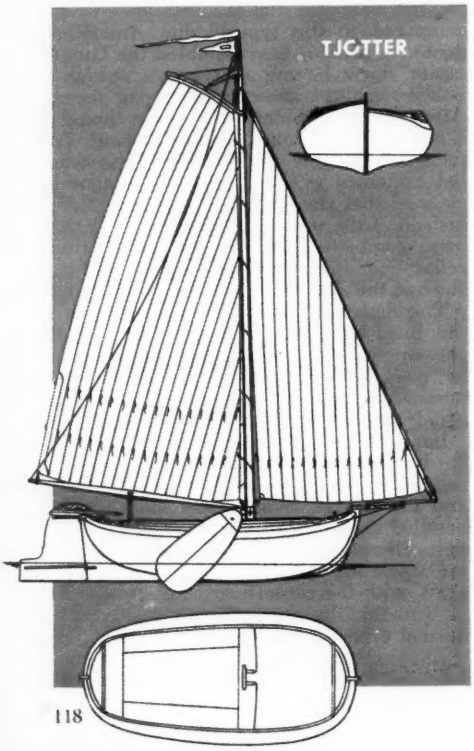
So it is understandable that *Grey Dawn II* inspired many an argument; for she was, to say the least, unusual in appearance when compared to the typical slim American yacht. In profile, she resembled the Gloucester dory, having that type's straight, bold bow; flat transom; and strong sheer. After that commendable beginning, though, she strayed far from familiar ground. To name but a few peculiarities: she was flat-bottomed even though the designers claimed that she was an offshore cruiser; instead of the usual sliding hatch over the main companionway, she had a slanting cellar-door affair; and, on a length of 37 ft., she had the awe-inspiring beam of 14 ft.

The designers were unperturbed at all the headshaking she evoked. They had chosen the Dutch Grundel as the prototype because they wanted a roomy boat, economical to build and maintain, with an unusual amount of headroom to make the cabin cool in the warmest weather. The flat bottom would allow her to remain upright if she went aground on a falling tide and the good freeboard and short, easily handled sail plan would impart seakindliness. Because of the widely flaring sides, the waterline beam was only 10 ft. The draft, with the centerboard raised, was 26 in. Note that the latter dimensions are quite normal even for an American type.

In the research that went into the design it was quickly discovered that certain Dutch



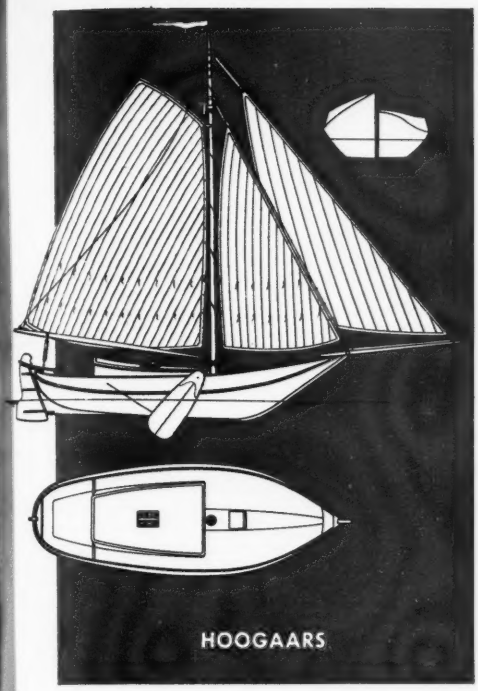


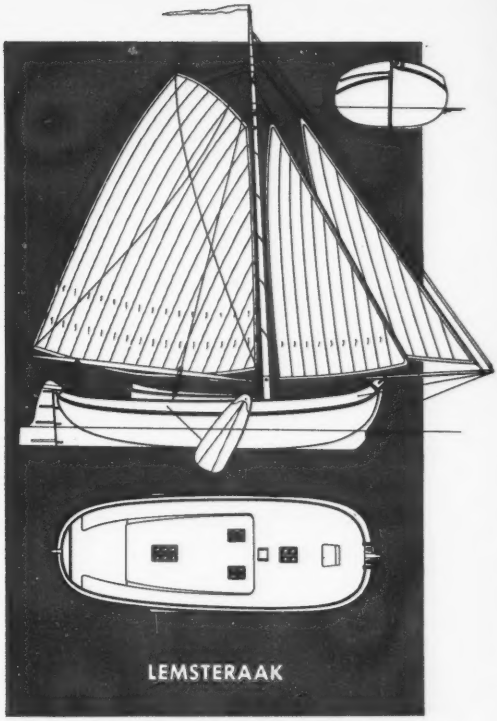


ideas could not be accepted for the American market. Virtually all Dutchmen carry unwieldy and unlovely leeboards, which American yachtsmen would not tolerate. Most of the gaffs, for some reason, are steam-bent into a slight S shape. Timber and labor must be cheap in Holland, and Dutch designers and builders must abhor a straight line or simple curve. Even in the cabins the joiner work is bent and carved to a point where its cost would double the building expense here in America. And in places where an American designer would use a timber 2 in. square, the builder in Holland might use a piece having eight times the cross-sectional area. So, although the general hull form followed the original Dutch lines, *Grey Dawn II's* construction was simplified and a centerboard was substituted for the leeboards.

Below deck, she had a forepeak storage locker so large that two persons could stand up and move around in it. There was—in fact there still is, for she is still in service—a two-berth stateroom, an enclosed lavatory, and a main cabin that is actually 14x14 ft., larger than many living rooms ashore. Headroom averages close to 7 ft. For use when the wind fails, there's a 10-hp. engine under the afterdeck.

After launching, she was used in New

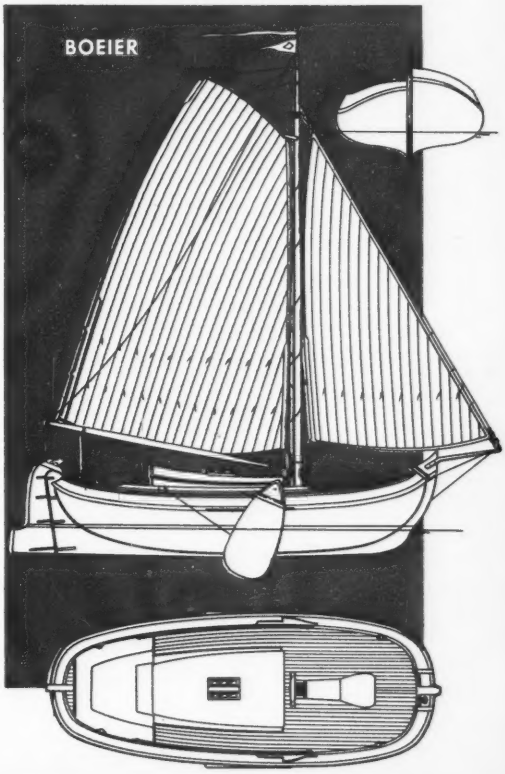




York waters, regularly sailing out through Fire Island Inlet and along the coast. Later, she cruised to Florida; then down through the West Indies and, single-handed, back up to the Chesapeake. She proved to be a success not only as an able offshore auxiliary with a surprising turn of speed but also as a comfortable boat on which to live.

This first Americanized Dutchman has been followed by many more from the same design board, in lengths ranging down to a little 16-footer. One has sailed for years on the Gulf of Mexico and is famed for her stability and speed. Another, fresh from the builder, started down the coast in winter and weathered storms that sent commercial shipping to shelter.

Besides the Grundel, there are other distinctive hull forms in Holland that might be advantageously adapted for American use. Several representative ones are shown on these pages. Your Editors, impressed by the performance of boats in Westlawn's *Grey Dawn* series, have asked the designers to prepare plans for a smaller version of *Grey Dawn II*. The new boat, *Flying Dutchman* by name, is 22 ft. long and has luxurious accommodations for two. For the first installment of a two-part story on how to build her, don't miss next month's MI! •



car care

Now is the time to make this handy windshield scraper. Just fit a dowel into the side of an old photo squeegee.

If muffler and tail pipe are suspected of being clogged, try tapping them lightly at various points while an assistant guns the motor. If rust and dirt come out of the exhaust, it may be one explanation for lack of power.

The fuel pump on your car has a vacuum booster if there is a tube from the intake manifold to the pump and another one to the wipers.

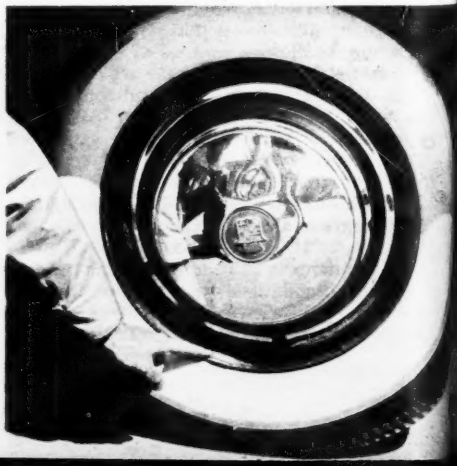
Increased generator output can be obtained by using a smaller pulley on the generator. If the generator cannot be pulled far enough away to take up the slack, try a smaller belt.

Loose jets will cause gasoline to leak from a carburetor when the car stands overnight.

Engine irregularity frequently can be traced to a worn distributor shaft. Few owners realize that the worn shaft makes a poor ground for low tension current.

A sticking lock can be freed by squirting alcohol into the keyhole followed by powdered graphite. Apply the graphite to the key. Oil will clog the lock.

High speed, underinflation and rough roads tend to loosen wheel balancing weights. Look them over to make certain that they have not changed position.



Never judge hose by outside appearance. This one looked good but was rotted inside.

Spare fan belts tend to deteriorate after long storage. Test for pliability before installing.

BEHIND THE WHEEL

With Fred Russell

If you want a personal reply, please include a self-addressed, stamped envelope.

I can stop and start my 1937 Chevrolet but after a 20-minute wait it is very hard to restart, even thought the battery is fully charged. Cables in good condition and starting motor completely overhauled. Donald Mountz, Pittsburgh, Pa.

You may be bothered by varnish. This is a gummy deposit which binds when the engine has cooled somewhat. Try pouring a solvent through the spark plug openings.

What causes my 1946 Ford to shudder when I engage the clutch in either reverse or low? Sam Bailey, Atlanta, Ga.

This is clutch chatter due to loose motor mounts or glazed or oily clutch surfaces.

I have a 1941 Chrysler and get a clanking sound in the rear end when I take my foot off the gas and then press it down again. John N. Andrews, Rome, New York.

The noise in the rear end of your car suggests worn universal joints.

Can I put a new motor in my 1931 Oldsmobile? C. D. Webb, Vine Grove, Ky.

Suggest you write to Olds Motor Division, General Motors, Lansing, Mich., for their opinion.

What is the water capacity of my 1939 Buick, Series 40? Stanley Jee Tun, Reno, Nev.

13½ qts.

My 1938 Chrysler has been a problem since it was new. Motor is always rough when idling, on a downgrade, or when operating with a light load. It will smooth out, however, when the throttle is depressed, such as for hill climbing. L. T. Ramsdell, Hattiesburg, Miss.

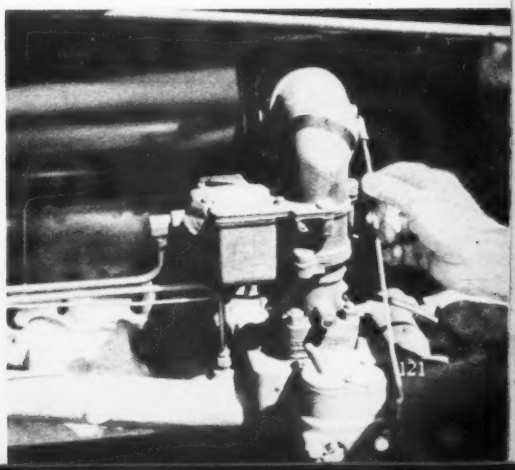
The valve springs may be weak. This would account for valve trouble on downgrades. On upgrades the throttle is open and the valves are being forced shut.

Why is my 1937 La Salle difficult to put into gear, especially in first? Richard Tongsteelt, St. Louis, Mo.

Trouble may be due to dragging clutch due to oil working past rear main bearing.

By squirting some oil between the body and the fender you will prevent rain from getting a foothold to start rust. It will also eliminate body squeaks.

Excessive cranking may be a tip-off that the choke control needs attention. Make certain that the butterfly is fully closed when engine is cold.



Your Car's Cooling System

By Fred Russell

Photos by Robert Brightman

CARBURETION may be the car's heart and ignition its nervous system but temperature control is its real breath of life. The internal combustion engine just won't work efficiently unless there's a happy medium between overcooling and overheating.

Actually every car engine is air-cooled. It just wouldn't operate if you cut off the air flow. Water—straight or mixed with anti-freeze—merely serves as an intermediary. With the aid of water and circulating air, engineers try to obtain a balance so that the engine won't be overcooled. That explains why you should not run without a motor thermostat, even in summer. You'll get better gas mileage and a quicker warm-up if the thermostat is set to open "high." In cold weather, however, we are limited by the kind of anti-freeze used.

Hidden from view is the fact that circulation of coolant is partly automatic, without benefit of water pump. In the old days everyone was familiar with the thermosyphon system, a ten-dollar term for the process of coolant circulation based on the rising of heated water. No pump was used. This, however, was too slow for comfort, involved use of too much water, handicapped efficient warm-up. But the thermosyphon effect is still with us.

Although engines are running hotter the cooling system remains about the same. Anti-freeze people deplore this fact because they often are blamed for whatever goes wrong. Better control of the air flow would help, yet only one American car uses automatic radiator shutters. Fan control is offered by another manufacturer as special equipment.

It is unfortunate that the term "permanent" has been applied to certain anti-freezes. So long as we have engines with demountable heads there can be no permanent coolant. And don't be misled into believing that a pressure cap makes your car's cooling system a closed one.

"Permanent" simply means that the anti-freeze has a higher-than-water boiling point and thus will not be so likely to

Check capacity of cooling system. Measure out correct amount of anti-freeze needed to bring coolant strength up to lowest anticipated temperature.

Connect a piece of hose to radiator overflow pipe and run engine at a fast idle. If bubbles show in jar of water, then the water pump is sucking air.

Heater connections are tough on hose. Here's a curved job that should be replaced. Rotting is hastened when hose is in contact with hot manifold.

If your car has a pressure cooling system, make certain that the radiator cap spring-loaded release valve is not stuck. Clean with hot water.

be lost during the winter. Pressure caps are used because the average cooling system isn't adequate for use with alcohol anti-freeze which boils at a temperature of less than 212°. Because there is slow, but constant leakage of combustion gases past the cylinder head gasket into the coolant, any anti-freeze becomes contaminated and acidified with a winter's normal use. If it is left in the system all year, it may eat into the gasket, causing a leak which may damage the motor. In addition to this, any anti-freeze, no matter how augmented with inhibitors against rusting, foaming and seepage will lose these extra properties if used too long.

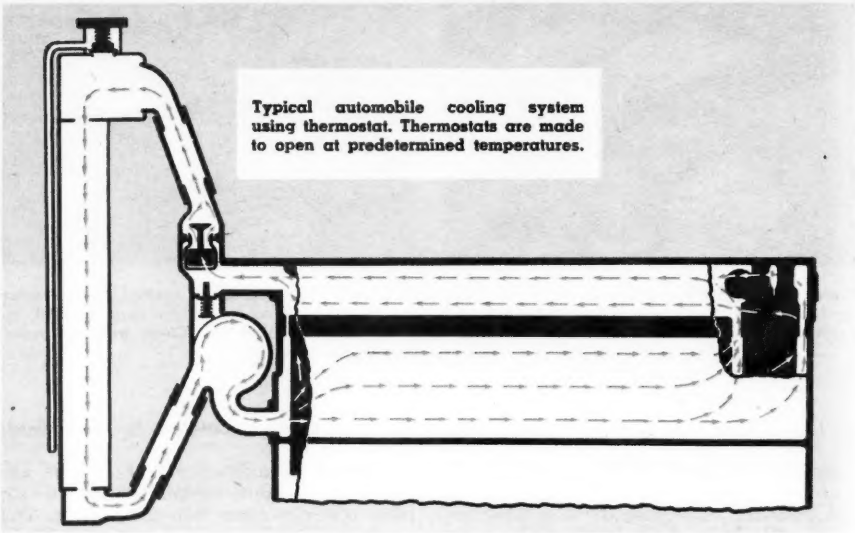
This need for fresh anti-freeze is no sales argument. Makers of *Prestone* originally felt that it was desirable to use this anti-freeze all year, but road men began reporting gasket trouble. No one had stopped to realize that the same thing would have happened had the cars been running all year on the same filling of water. Anti-freeze with ethylene glycol base (*Zerex, Prestone, GM,* etc.) does make a good summer coolant, but, be sure to use a fresh solution.

Right now millions of car owners are wondering about certain things which have recently come into the picture. The matter of inhibitors, for instance. Years ago New York chauffeurs used to check radiator rusting by putting a few drops of sewing machine oil into the cooling system. The idea seemed to work. It never gained headway with the public for the reason that the average motorist who tried it used too much oil or the wrong kind. Not until an emulsifying oil was formulated did the inhibitor idea really catch on. Good grades of anti-freeze, whether alcohol or ethylene glycol base, are treated with rust inhibitor, but this loses its effectiveness after a winter's use. Add an inhibitor to the fresh water used for the summer driving. Add inhibitor if the stuff you select for the winter doesn't contain it. The label on the anti-freeze can should tell you whether or not the solution is treated.

Some of the inhibitors are chemicals rather than emulsifying oils. Special in-

Your service station has a special combination water and air gun for flushing radiator and block. First flush in reverse direction and then in normal.

Level of coolant should be about two inches below the top of overflow pipe. This is necessary to allow for expansion when motor warms up.



Typical automobile cooling system using thermostat. Thermostats are made to open at predetermined temperatures.

hibitors are also used in anti-freeze with ethylene glycol base to check foaming. If you have used such anti-freeze and found that the coolant level had a queer way of dropping, with definite assurances that there are no leaks, you will be on the right track in assuming that the stuff wasn't properly treated to prevent foaming. Air bubbles increase the volume of the solution, the excess then goes out the overflow pipe.

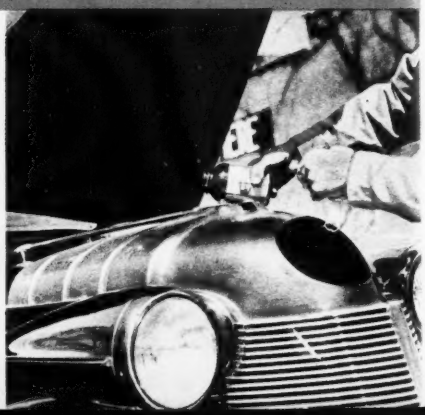
Seepage, that annoying habit ethylene glycol has of working out slowly around core plugs, hose connections and head gaskets, is also controlled in the more advanced products. Rust inhibitor, if it is of the petroleum type, helps to check seepage. Incidentally, where oils are used as inhibitors the anti-freeze has a little additional protective value against the cold. This is a good time to warn against using kerosene as an anti-freeze even in extremely cold climates. It's a fuel. Its vapors can be dangerous if the engine overheats or develops trouble.

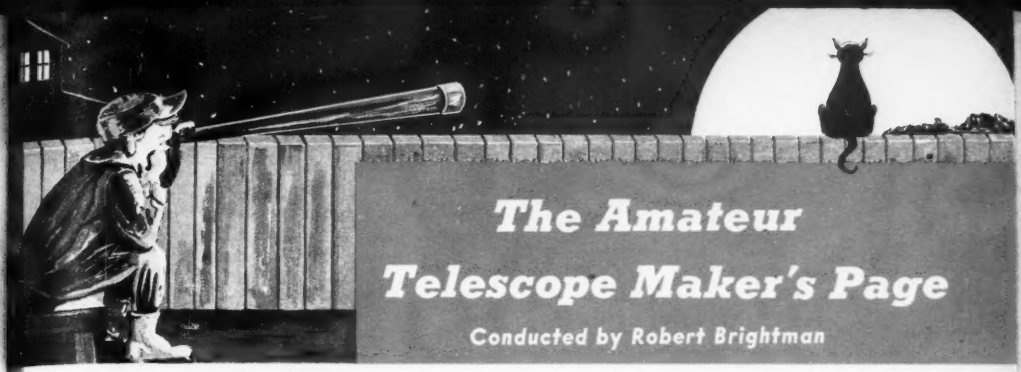
Also on the taboo list are inorganic salts such as calcium chloride. Thumbs down, too, on sugar solutions, such as honey and molasses. These become too viscous at low temperatures, retarding circulation. When these sugars char in the cooling system they are a real problem.

I have been using rust inhibitor for twelve years and have not had any sign of rust in the cooling system of any of the cars I have owned in [*Continued on page* 134]

Oil in cooling system may indicate a cracked head or a defective gasket. Do not confuse this with the emulsifying oil used as a rust preventive.

A good rust preventive will do wonders toward keeping the cooling system free of rust and scale. If possible, avoid using hard water in radiator.





The Amateur Telescope Maker's Page

Conducted by Robert Brightman

Pipe fittings, the kind one plumber forgot, are put into service by a reader as a mounting for his telescope.

IN an effort to maintain portability of his telescope and, at the same time, be assured of a smooth working polar axis, one of our readers, Douglass Kinnes of Baldwin, L. I. sends us the accompanying photographs to show his solution.

As you can see from the picture at the right, the answer seems to lie in using the proper number of pipe fittings and the right combination.

Reading in the usual order, the bearing for the polar axis consists of a floor flange, a close nipple, and a 45° elbow. All of these are what is known in the trade as 2½ in. fittings. We do admit that this is a bit light for a telescope as big as MI's but, Mr. Kinnes informs us, this size was chosen as a compromise in order to avoid making the entire mounting too heavy.

He informs us that when and if he dismantles this instrument for a more permanent site, he plans to use 6 in. fittings, to which we heartily agree.

Note the pipe plug at the extreme right. This is not a part of the polar axis assembly. Plug is inserted at the bottom of the 45° elbow as a means of engaging a 1½ in. pipe. This pipe, in turn, fits through the collar of the tripod. Note the bolt with the cross bar through the head. By loosening it, Mr. Kinnes can rotate the telescope as a unit in order to point the polar axis to the celestial North Pole. Once this is done, the bolt is tightened and further movement of the telescope on the polar axis is by means of the nipple.

Mr. Kinnes contributes an interesting wrinkle. Inasmuch as all pipe fittings are tight in one position and loose in another, he has screwed the nipple into the flange rather loosely so that the bearing surface is distributed at two points, inside the elbow and inside the flange. •

The four 2½ in. fittings used as a bearing for the polar axis. Below: The assembled view. For a permanent mounting, 6 in. fittings should be used.

Monthly Photo Contest

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Address: Monthly Photo Contest Editor, MECHANIX ILLUSTRATED, 67 W. 44th Street, New York 18, N. Y.

First Prize ($10.00) .....Mother
Left: Donald Judevine of Selma, Alabama, captures first prize with photoflood shot of his mom.

$5.00 Award .....His First Trimming
Flash was used by Louis Angelo of Niagara Falls to record an important event in a youngster's life.

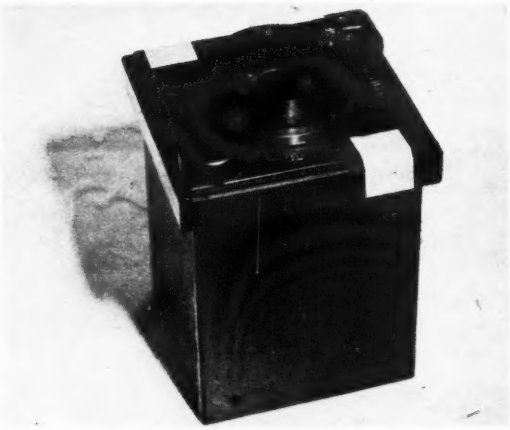
$5.00 Award .....Finished
An outdoor shot, 4x5 Auto Graflex, Super XX, 1/50th at f-16 by Joseph Ferrance of Lowville, N. Y.

$5.00 Award .....Mopping Up
A Canal Zone GI, Robert H. Rolofson, sends us this photo of his buddy. Pan film, bright sun.

Photo Wrinkles

Exposure Meter Pouch. Even though you employ a valet to carry your miniature camera accessories, you should house your exposure meter in a case of some sort. A most convenient one can be made from a zipper-type tobacco pouch. They are practically made to order for Weston meters and for many of the other popular makes.

Variable Contrast Printer. This new printer enables the darkroom worker to get soft, medium or hard contrast from the same negative with a single grade of paper. Turn a knob to get the desired contrast; it operates a Venetian blind filter arrangement, which, in conjunction with Defender's Varigam enlarging paper, makes the various grades of contrast possible. Can be used with ordinary paper too.



Develop at 68 F. A small thermometer attached to the lid of your developing solution will give you an approximate idea of its temperature so that, if necessary, you can store it in a location having a more normal temperature range.

Film Insurance. Two pieces of Scotch tape fastened to the tank will prevent many a minor darkroom tragedy. They will prevent accidental removal of the tank lid during development until the final minute of fixing has arrived.

A Camera Fan's Luncheon. Double duty can be obtained from your lunch box if you use a hand camera and a small flash gun. See the two photos above. The box has ample room for the camera, flash gun and holder. These are kept in the bottom section. Flash bulbs, film and filters, fit conveniently into the top compartment. Note how the strap, which normally engages the Thermos flask, secures the flash bulbs. Do not line the box with cloth as then it will be practically useless for its original purpose. Wrap the reflector loosely with cloth to prevent possible scratching.

Tissue Holder. A discarded cut film holder attached to the lid of your camera case makes a particularly handy place where to store the never-at-hand lens tissue. The space formerly occupied by film is especially suitable as it is practically dustproof. Print your name and address in white on slide.

QUESTION BOX

by Robert Brightman

How can I duplicate 16mm movie film with a projector? Charles J. Geds, Cicero, Ill.
The best way to duplicate movie film is by means of the camera, not the projector. About 25 ft. of the film to be duplicated is rolled up in contact with raw film (emulsion to emulsion), fed through the camera gate in the ordinary way, and then exposed to a 10-watt lamp with an aperture setting of about f-8.

Can I use a Kodak Telek lens on my Rolleicord? Thomas H. Launey, Toronto, Canada.
You cannot use a Telek lens with this camera as the camera lens is not capable of sufficient extension.

Can I use color film in my No. 2 Folding Cartridge Hawk-Eye Camera? Don Williams, Naugatuck, Conn.
We do not recommend color film for this camera; the lens is not adequately corrected for the use of this film.

What is the size of a Bantam negative? Clifford W. Hartley, Olive View, Calif.
1⅛x1⅝ in.

Can I use a filter with my Brownie Reflex; what size? Howard Oechsle, Fort Wayne, Indiana.
Yes, use a No. 13 filter.

Can you give me some information about the Minox camera? E. D. Colbern, Whitehall, N. Y.
The Minox was originally made in Lithuania. It is about as big as a package of Life Savers. This camera has a fixed focus lens and shutter speeds up to about 1/200th of a second. We do not know if film cartridges are still available; however, we suggest you get in touch with Willoughby's, 110 West 32nd St., N.Y.C.

What is the "f" value of my Falcon camera? Jack Whitten, Shawnee, Okla.
About f-13.

Is there any practical way to cool my developing solution during hot weather? Tom Rives, Atlanta, Georgia.
Insert the tray in a larger tray containing an ice water solution or place a tumbler containing a few ice cubes in one corner of the tray.

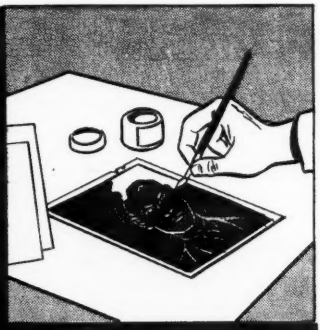
HAVE you ever taken a figure out of a group shot and enlarged it into a beautiful portrait only to find the background too conspicuous?

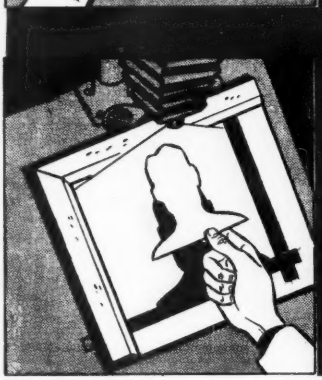
The sketches illustrate four methods by which such a distracting background can be eliminated. Compare portrait at the left with inset. Quite an improvement, isn't it?—*Wesley R. Scheid.*

BLACK BACKGROUNDS

Left: The simplest method is to trim away the unwanted area of the negative with a pair of scissors.

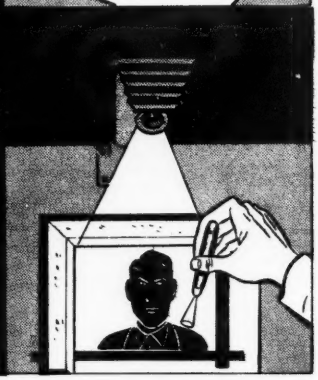
Right: A second method consists of bleaching out the background with a chemical reducer. Both of these methods however destroy part of negative.





Left: A black background can also be obtained by the use of a cut-out over easel. Use as mask while background darkens.

Right: Mask a pen-type flashlight so that only a pin-point of light shows. Then use this to burn in the background. Use a red filter over enlarger lens to prevent further printing of the image



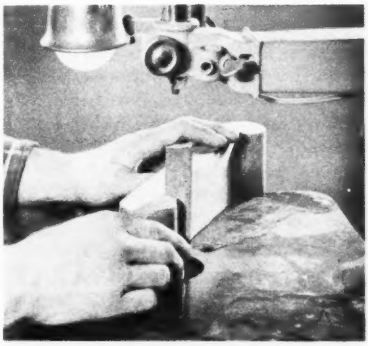
modern PICTURE FRAME

TWO pieces of walnut or maple plus two sheets of glass are all you will need to build this striking picture frame.

The base and the upright can be cut with a band saw. The grooves for the glass should be cut with a dado head or shaper. To assure alignment, the grooved upright must be fitted into the base before the slot in the base is determined.

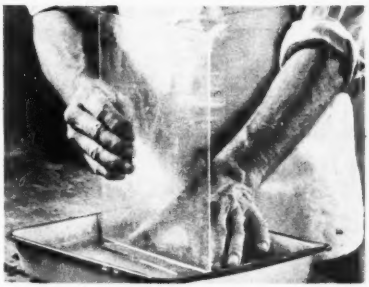
Since the edges of the glass are exposed on two sides, they should be ground smooth. One method of doing this is illustrated at the bottom of this page.

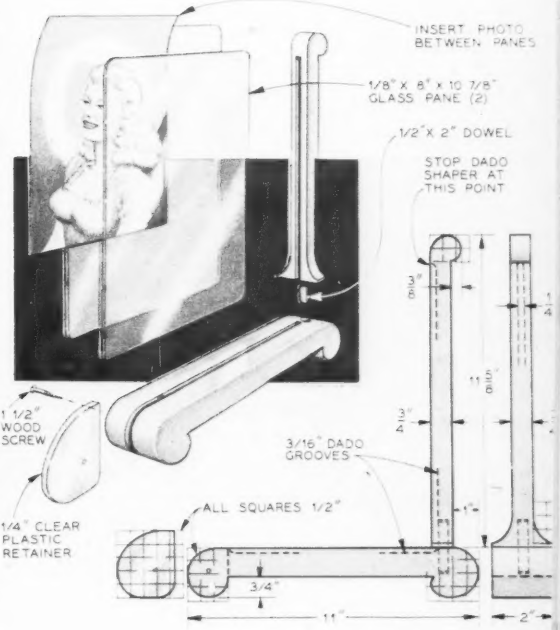
After the photograph has been positioned between the two sheets of glass, insert the sandwich into the frame. Note that a plastic retainer is used on the left side of the frame. This is not absolutely necessary but it does prevent the glass from slipping. If you like, the frame can be made to hold two photographs, back to back.—*Milt Evans.*



A file chucked into one end of a jig saw will enable you to smooth the scrolls with minimum effort. Use walnut or maple stock.

One method of smoothing the edges of the glass is to grind them under water with a medium coarse stone, held at a slight angle.





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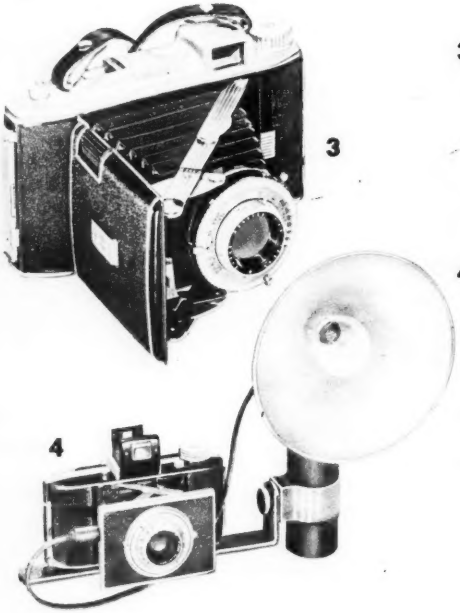
2



3

4

1 KODAK REFLEX CAMERA—Twin lenses—4-element *f*/3.5 for speed, *Lumenized* for brilliance, superbly corrected for sharpness, for beautiful color. 1/200 Flash Kodamatic Shutter. Black-and-white pictures, 2¼ x 2¼; Kodacolor snaps, about 3 x 3. With field case, $120; Flasholder, $9.50.

2 KODAK 35 CAMERA WITH RANGE FINDER—*Lumenized* *f*/3.5 lens yields superb color transparencies and prints, sharp black-and-whites for big enlargements. Coupled range finder. 1/200 Flash Kodamatic Shutter. Automatic shutter cocking, double-exposure prevention. $75; Flasholder, $9.50.

3 KODAK TOURIST CAMERA—Finest folding model yet. Hard-coated *f*/4.5 lens, 1/200 shutter. Built-in exposure computer. Efficient new-type shutter release on bed of camera. Black-and-white pictures, 2¼ x 3¼; color snaps, about 3 x 4½. $61.50; also lower-priced models. Flasholder, $9.50.

4 KODAK FLASH BANTAM CAMERA *f*/4.5—Small, light, moderately priced. Makes sharp black-and-white negatives; also full-color Kodachrome transparencies for projection on the home screen and for Kodachrome Prints and Enlargements. *Lumenized* *f*/4.5 lens, 1/200-second shutter. $50; Flasholder, $9.50.

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5 KODASLIDE TABLE VIEWER—entirely new type of projection viewer for 2x2 cardboard or glass slides, or a combination of both. Superb for small group shows, editing, and quick viewing. 7½x7½-inch Kodak Day-View Screen gives brilliant image in lighted room. Has *Lumenized* f/3.5 lens (Kodak Ektanon), slide changer, cooling system, focusing lever. $95.

6 KODASLIDE PROJECTOR, MODEL 1A—takes 2 x 2 cardboard or glass slides. Projects big, bright images up to 84 inches wide. Sharp focusing with the Kodak Projection Ektanon Lens, 4-inch f/3.5. *Lumenized* optical system increases screen brilliance 50%. $27.50.

7 KODAK PORTABLE MINIATURE ENLARGER—blows up 35mm. or Bantam negatives. Three-lens condenser system, heat-absorbing glass, 50-watt lamp insure high-quality prints. Price, $48.50. Pack-All Case is ideal storage place . . . handy for trips. $15.

8 KODAK TRIPODS—all types of camera supports for movie or still cameras—for all-round better pictures. Wide price range. Visit your nearest Kodak dealer for a complete review of the Kodak line-up.

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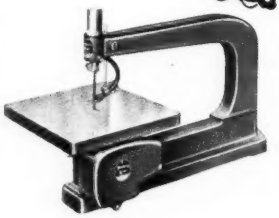
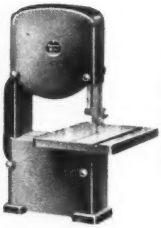
18" JIG SAW

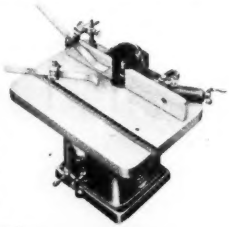
For scrolls, inlays fretwork, etc. in plastics, light metals, or wood up to 2" thick. 12" x 12" tilting table. Heavily built for smooth blade action. Chuck takes machine files and sabres.





12" BAND SAW

For cutting unusual external shapes. Capacity 12" from blade to arm. 6½" above table. 14" x 14" precision ground table tilts both ways. Four precision ball bearings on saw wheels, Oilite blade guides, 2 ball bearing blade support wheels.



WOOD SHAPER

For decorative fluting and moldings on chairs, tables, desks, cabinets, beds, windows, etc. 15" x 10½" table raises and lowers. Ball bearings. Takes all cutters with ½" bore.

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Car's Cooling System

[*Continued from page* 124]

this period. Inhibitor won't take out rust that has already collected, but it will check further rusting. Obviously the smart thing is to use inhibitor from the time the car is new. When adding inhibitor to a fresh supply of water in a clean system fill to within about two inches of the top of the overflow pipe and then add the inhibitor, running the engine until the thermostat opens. Unless this is done there may be poor distribution of inhibitor. Keep in mind, that if you have to add a lot of water during the summer season the inhibitor will lose its effectiveness. Where you must drive at high speed steadily, you will find one or two extra additions of inhibitor necessary. Speed tends to force the pump to suck air, and that foams the coolant so that some of it escapes via the overflow.

Servicing The Cooling System. Whether to clean it out, all depends on how well you have managed to protect it. I have not had to use cleansers for 12 years. It is always well to flush the system after removing anti-freeze in the spring, but whether a cleaning is needed is largely dependent on how effective and how consistent the inhibiting has been. Should cleaning be needed, note first if rusting is serious enough to require some manual cleaning of the block and reverse flushing. By removing the block's core plugs, or the side plate (if the engine has one), it is possible to remove scale manually. A heavy accumulation of such scale will overheat the oil, break it down and lower oil pressure. This has fooled many an owner into thinking the motor bearings were worn.

In reverse flushing the block, be sure to disconnect the hose to the radiator, otherwise some of the dislodged scale will pass into the core. Remove the motor thermostat, too. Whether the radiator core is clogged is easily determined by removing the lower hose and noting if water is delayed in coming out at the bottom.

Cores are of two types; the cellular and the tubular. Cleansing treatment differs for each and it is well to let an experienced radiator man take care of any core that is definitely clogged. The book is filled with cases where owners have ruined radiators with careless use of acids and by "rodding" a cellular core.

The Society of Automotive Engineers recommends preventive cleaning and corrective cleaning. Under the first process it tells you to drain the system, add cleaner compound and fill the system with water. Then run the engine at fast idle so as to heat the cleaning solution to at least 180°, but not to boiling. After draining a neutralizer is added, and the system again filled with water. After five minutes of fast idling the system is then drained

[*Continued on page* 136]

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NEW "flight-smooth" comfort that irons out bumps like magic!

NEW "road-hug" stability that makes handling easy and sure!

NEW "effortless" steering that gives positive control at all speeds!

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NEW unmatched performance for greatest fun and thrills!

You'll think you've got wings . . . when you take off down the highway on this jet-like streamliner! It's so smooth, so comfortable! It handles so easily, hugs the highway so securely, stops so quickly! Amazing Hydra-Glide Fork irons out bumps like magic, gives you effortless steering ease, new riding stability even on roughest roads. Faster-action, oversize front brake gives you increased stopping power. Sealed ray headlight makes night riding a pleasure. These and other features of the 1949 Harley-Davidson bring you new thrills, more fun, more enjoyment than ever before as you take in race meets, hillclimbs, endurance runs, gypsy tours, sightseeing trips. See your dealer today and mail the coupon now.

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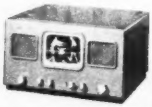

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Car's Cooling System

[*Continued from page* 134]

and refilled with water. Then follow an extra five-minute idling spell, another draining and another refilling.

Where it is necessary to give the system a corrective cleaning the preventive cleaning procedure is followed except that the amount of cleaning compound and the length of idling time are increased. Then the pressure flushing follows, in normal as well as reverse directions. The hot water heater should be flushed separately. In the case of underseat heaters this is especially important since cleaners tend to collect there and many cause corrosion.

Washing soda and organic solvents used to be favored as cleansers for the cooling system, but today oxalic acid and sodium bisulphate are favored. You can be reasonably sure of cleansers and neutralizers which carry well-known brand names. National Carbon Company has gone out of this line, but DuPont's cooling system aids are well distributed.

Leaks. The smart thing, of course, is to check for leakage before installing any anti-freeze. If a leak develops during the winter don't use a stop-leak compound. It may have an unfavorable effect on the anti-freeze inhibitors. Should the leak develop after anti-freeze is removed, however, a stop-leak may be used and often quite effectively. Naturally much depends on conditions such as the age of the car and the cost involved in checking the leak by other means. These compounds do not interfere with circulation.

Installing Anti-Freeze. The first step is to warm up the system and then drain it off completely. Remember the petcocks at the side and rear of the motor block (two of them for a V-8 motor) and the heater. Then follow with the preventive or corrective cleaning jobs, *if necessary*. Consult your instruction book for the amount of anti-freeze required. Put about a gallon of water into the system and then follow with the anti-freeze, and top it off with enough water to bring the level to about three inches below the top of the radiator overflow pipe. Now run the engine until it is warm enough to open the motor thermostat fully and expel any air in the system, especially in the hot water heater. You may then need to add enough water to bring the coolant level to within two inches of the overflow pipe.

Testing anti-freeze this year will be somewhat complicated by the fact that the National Carbon Company has changed its inhibitors. This has changed the specific gravity of its solution and calls for a new hydrometer. Those already in use will show Prestone protection to zero when it is actually only 3° above. •

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· COMPLETE 5-IN-1 TOOL **$159.50** With special ½ H.P. ball bearing motor $195.50

Do your present power tools balk at big stock? Do they hold you back from the jobs you really want to do?

Then take a look at *SHOPSMITH* — the new, big capacity circular saw, wood lathe, disc sander, vertical and horizontal drill press all in one. Each has big capacity . . . built to husky specifications. And see what big jobs *SHOPSMITH* does in limited home workshop space.

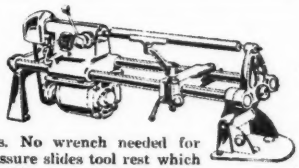
With all its big capacity and rugged construction *SHOPSMITH* stands just 59" long by 18" wide.

Check *SHOPSMITH* against your woodworking needs. See it demonstrated. For name of nearest *SHOPSMITH* dealer, and free folder, write Department M, Magna Engineering Corporation, 465 California Street, San Francisco 4, California.

1. SHOP SMITH AS CIRCULAR SAW Has 8" saw blade; depth of cut 2¼"; 14½" x 17" table, with extension 54" x 17"; up to 46" between blade and fence . . . so you can cut to center of 92" board. Table tilts to any angle — positive lock. Takes work on either side of blade. New principle provides micro-adjustment of distance between fence and saw blade.

Includes: 8" combination saw blade and arbor. Table extension. Mitre gauge. Rip fence. Saw guard. *And in less than one minute you can change from saw to lathe, disc sander or drill press!*

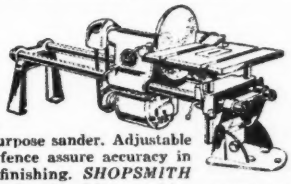
2. SHOP SMITH AS WOOD LATHE



Has 34" between centers. Fifteen-inch swing. Also turns light metals, plastics. No wrench needed for setup. Finger-tip pressure slides tool rest which locks in position. Variable speeds. Quill feed 4¼".

Includes: Tool rest. Drive center. Cup center. *SHOPSMITH is precision-machined, factory-tested for accurate work.*

3. SHOP SMITH AS DISC SANDER



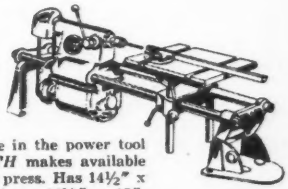
Has 12" disc; 14½" x 17" tilting table . . . supplies more work support than single-purpose sander. Adjustable mitre gauge and rip fence assure accuracy in squaring, mitering, finishing. *SHOPSMITH* discs can be removed and replaced in seconds . . . so you can sand a job with various grits.

Includes: 12" disc; balanced dynamically and statically. Mitre gauge. *SHOPSMITH is sturdily constructed . . . will take all the wear and tear you would ever give it.*

4. SHOP SMITH AS VERTICAL DRILL PRESS

Drills to center of 15" circle. Has 27" table-to-chuck clearance. Drills big stock. Has 4 grease-sealed Fafnir ball bearings. Quill can be fed from *left or right* side. Spindle: ⅝" Dia., 6 spline, hardened tip. Spindle feed: 4¼". Variable speeds. *Includes:* ½" Jacobs key chuck. Fence.

5. SHOP SMITH AS HORIZONTAL DRILL PRESS



For the first time in the power tool field, *SHOPSMITH* makes available a horizontal drill press. Has 14½" x 17" table; extends to 34½" x 17". Provides accurate method of drilling for doweling. And the only limit to length of work is size of your shop. *Includes:* ½" Jacobs key chuck. Mitre gauge. Table extension. *SHOPSMITH is also convertible to grinder, buffer, router, drum sander, shaper, scratch brusher.*

[*Continued from page* 99]

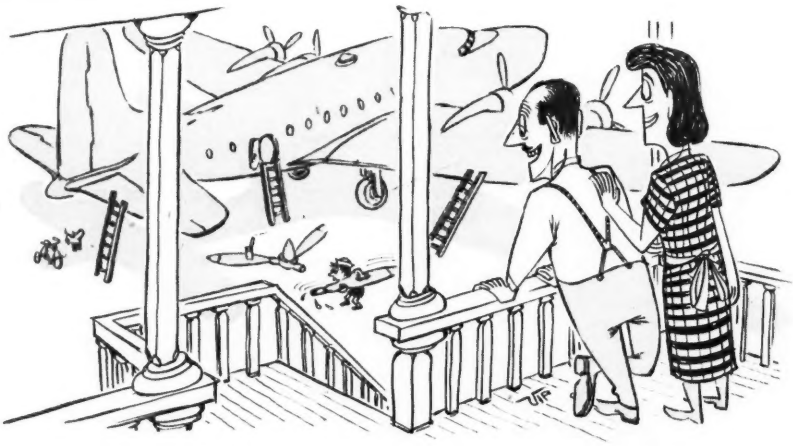
tween the stations and around the stem.

When you are satisfied that the cement has completely dried, remove the tape and cut off the frames to the sheer line but leave the curved beam which will later support the decking. Next carve a piece of ½ in. soft balsa to finish the stern. This piece should be flush with the bottom and side planking and with the top of Frame No. 7. Next cut out the motor block from pine or bass wood and screw the motor temporarily in place.

The propeller shaft consists of a piece of $\frac{1}{16}$ in. diameter brass rod. The shaft housing is a 5½ in. length of $\frac{1}{16}$ in. I. D. brass tubing, pushed through the keel at the indicated angle. It is best to drill the keel first, insert the housing containing the shaft and then connect the shaft with the motor, using a 1½ in. length of $\frac{1}{16}$ in. I. D. rubber or plastic tubing which acts as a coupling. Alter the position of the housing slightly so the shaft revolves freely and then cement the housing permanently in place. The propeller can either be built up from scrap brass or else procured from your local hobby shop where the rest of the parts are obtainable. The prop is soldered to the shaft. The rudder post is also a length of $\frac{1}{16}$ in. tubing, one end of which is slotted for the sheet brass rudder which is soldered in place. Now remove the motor and propeller shaft, apply two coats of model airplane dope and trim off the stem as shown in Figure 3. Finally, fit a false stem in place as indicated. The overlapped top will allow it to rest neatly on the deck.

The waterline is indicated in Fig. 1 (see Fig. 1—L.W.L.) and is easily marked off by masking with tape from stem to stern. Deck may be ruled in white to simulate planking if desired and if the builder is up to this rather tricky job. Deck fittings are easily carved from soft balsa and look neat when finished in silver dope. Put in the rudder post housing or tube and fit the rudder and rudder quadrant. Slip in the propeller shaft and your model is now ready to run. If you discover to your alarm that the propeller turns the wrong way simply reverse the batteries. As a final touch a simple windshield can be added. This is made from a small piece of celluloid cemented to the deck immediately aft of the switch.

Should the bow rest too deeply in the water, then add a bit of lead to the stern to obtain the indicated water line. Your model may be run free or, if you prefer, you may use a 20-foot length of light fishing line as a tether and run the model in circles. •



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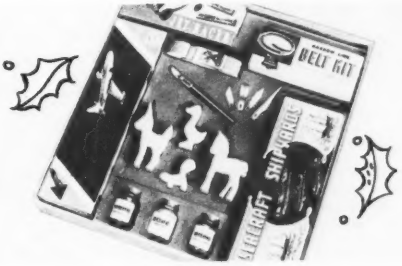

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Aluminum Salad Set

[*Continued from page* 97]

two holes in the fork as shown on the pattern and then cut away the metal in order to make the tines. File the edges smooth.

The hammered finish is simple, although a little practice is recommended. Tap in a steady rhythm with the ball end of a ball peen hammer. Use the same pressure for each tap and make the dents overlap. Start in the center and work outward in a spiral to form the bowl for the spoon. Hammering should be done over a smooth piece of steel such as an old flatiron.

For the handles, cut a slot 1¼ in. deep in one end of the ½ in. aluminum tubing previously specified. Flatten this end so that the spoon bowl can be slipped into the slot. A wood or plastic mallet is used to form the curve for the handle. This end should be flattened for about 4 in. Hammer it over a piece of pipe or a broom handle.

The handle for the fork is made in a similar fashion. Drill two holes through the handle and the shank of the bowl for rivets. Put the rivets through these holes with the head on top and flatten them from the back with the hammer. •

Shoot a Crow

[*Continued from page* 76]

wide. As crows come closer the fingers are gradually clenched about the muzzle, muting the tone until it is a smothered wail. If this procedure is correctly followed the incoming crows redouble their efforts to join the fray, often hurtling down on the concealed gunners in a dive-bomber swoop that pulls them out within 15 or 20 yards of the blind.

How many crows can you slay at a roost? I can cite from my own experience. One afternoon Red Watt, my constant partner of years of crow shooting, and I knocked over 369 crows between us, and quit only because we were tired.

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Only Dremel offers you a portable, precision drill press at such an amazingly low price. Just the thing for creating costume jewelry, model making, wood carving, routing, etc. Utilizes Model No. 2 Moto-Tool, which can be raised or lowered, swung in any direction, or quickly removed for off-hand use. Drill Press stands 12" high. Base is 6¾"x4". Weighs approximately 3½ pounds.

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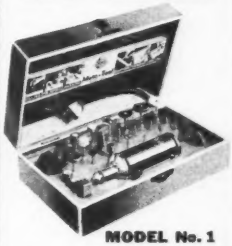

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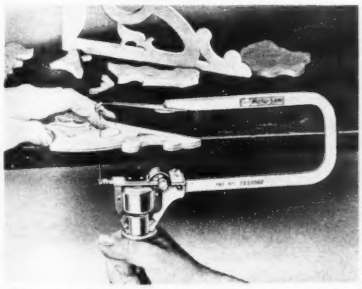

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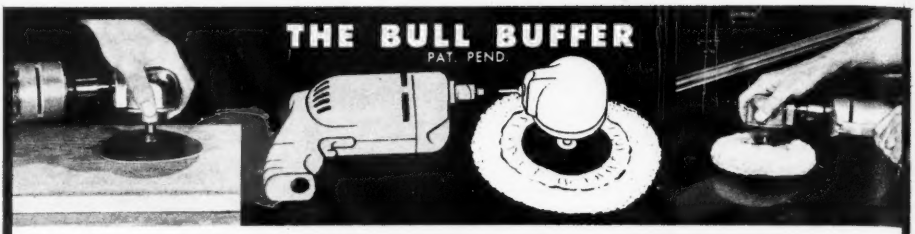

You polish and sand faster, easier—do beautiful *professional* work—with this amazing new attachment for your electric drill. And it more than pays for itself *the very first time* you polish and sand your car, floors, woodwork, furniture.

The Bull Buffer fits any chuck on an electric drill (or flexible shaft.) It's the only buffer you can turn *in a complete circle* while you hold your drill stationary. Reaches all curved and flat surfaces. It's packed with power, built of lifetime materials and *guaranteed*.

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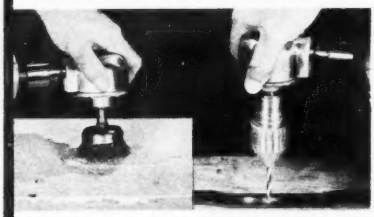

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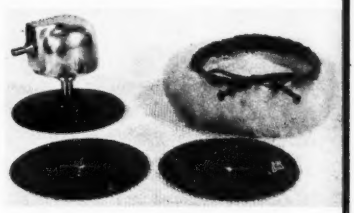

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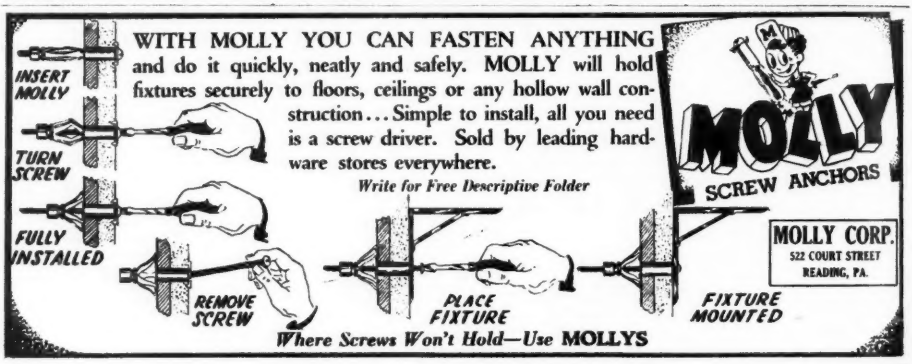

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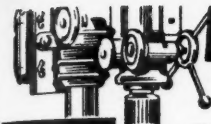

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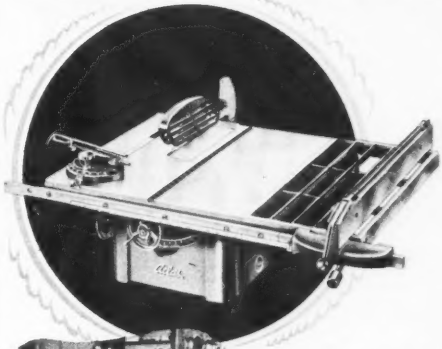

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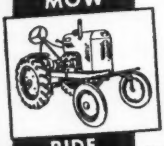

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LOOK ON PAGE 156

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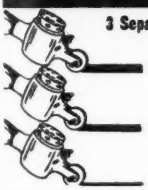

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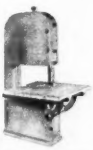

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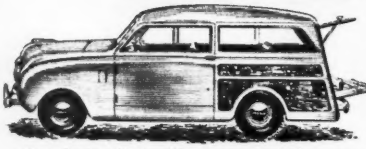

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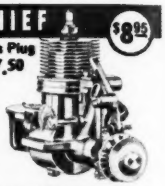

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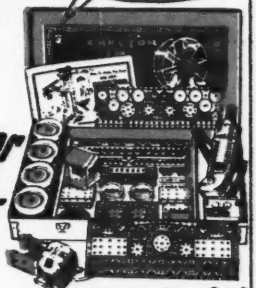

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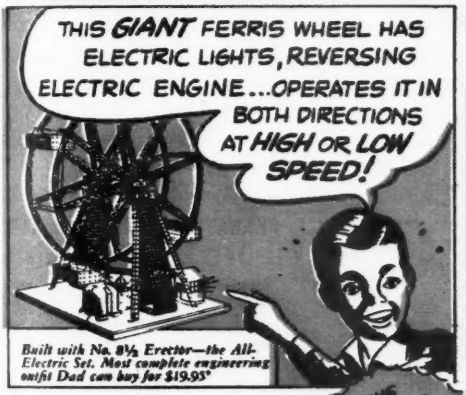

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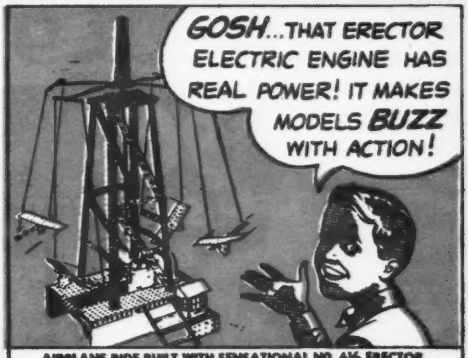

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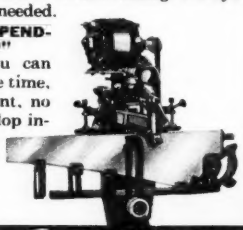

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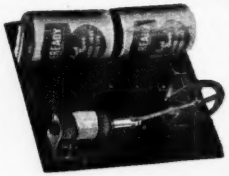

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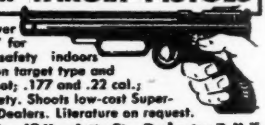

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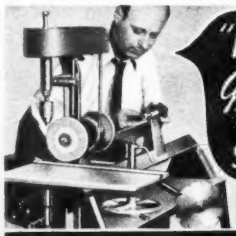

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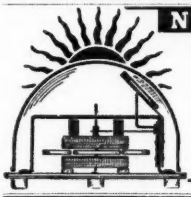

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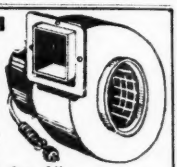

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SEE GOLDEN Hamsters ad on page 48. Shows picture of Hamster.

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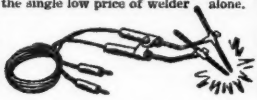

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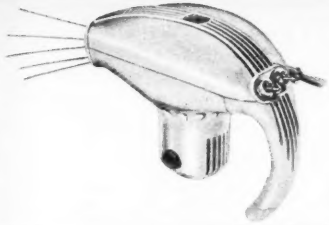

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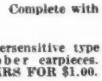

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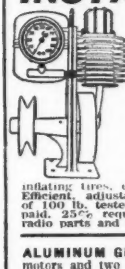

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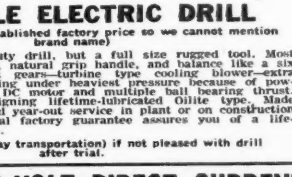

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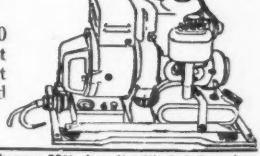

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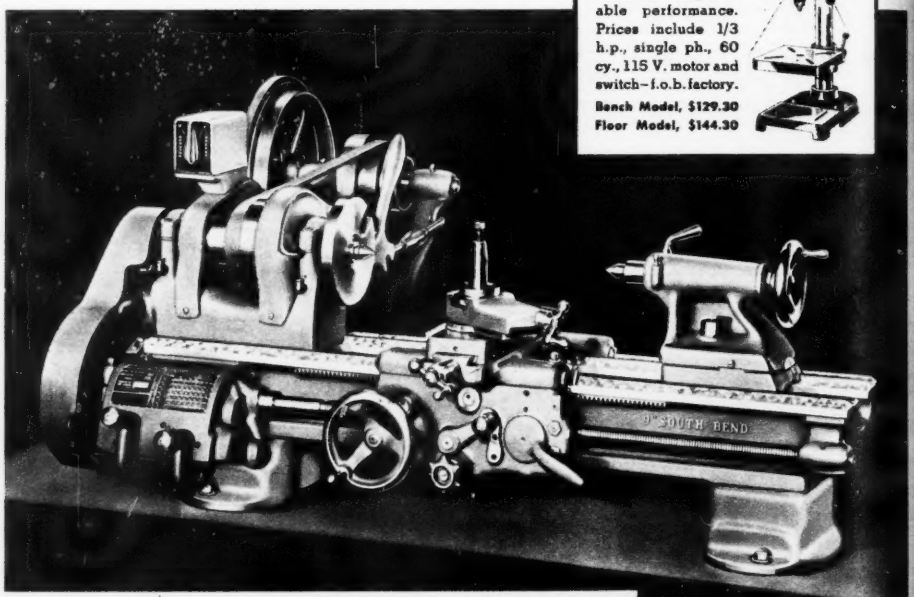

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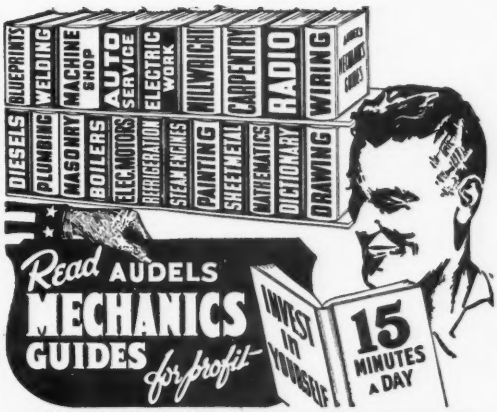

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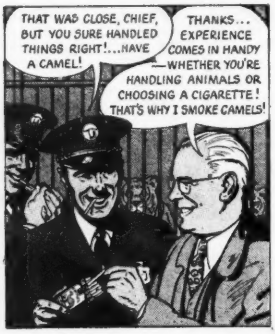

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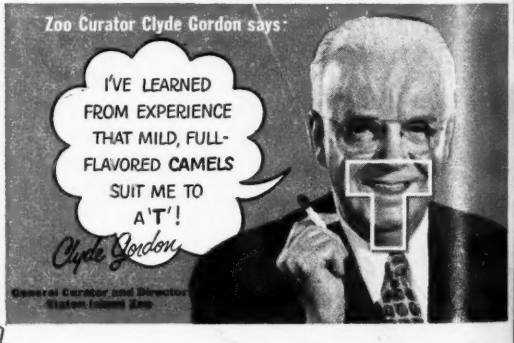

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